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T.U.C. Faith in Nationalisation

DISCUSSION by the Trades Union Congress at Douglas last week of public ownership of industry resulted in a re-affirmation of faith in the common ownership and "democratic control" of key industries, and in an instruction to the T.U.C. General Council to prepare a report on nationalisation. The Council is to take account of its report of 1953, which stated that public opinion was not then prepared for transfer of more industries to public ownership, and that proposals for further nationalisation must be based on experience already gained and on the present needs of the community. The new inquiry is expected to be completed in time for the 1962 Congress. The threat, therefore, of nationalisation of the machine tool industry, should the Labour Party be returned to power, remains. That industry was not mentioned at Douglas. Some T.U.C. members maintain that the industries which it is proposed to nationalise should be listed, because uncertainty alienates voters; others believe that to publish such a list before return to power would play into the hands of the opponents of nationalisation. There are many considerations affecting the engineering unions in the acquisition by the State of the machine tool industry, and these are being discussed between the T.U.C. and the unions. The General Council in preparing its report must consider specific industries, but the approach to the subject is to be "flexible." Nationalisation on the same basis as that of the railways is regarded by the T.U.C. as unsuited to some industries. Those examined in the 1953 report included railway equipment and heavy electrical goods. The practical difficulties of nationalising these are great, and it is doubtful whether the T.U.C. General Council can submit suggestions by 1962 on the best way to execute this ill-advised threat. As to the nationalised railways, Mr. S. F. Greene, General Secretary of the National Union of Railwaymen, moved a resolution, which was carried, at Douglas, reiterating T.U.C. belief in nationalised transport and opposing any attempt to separate the Regions of British Railways. The hiving off of any part of the nationalised transport undertaking, he stated, would be resisted strongly. It is true that sale of the more profitable parts, such as hotels and catering, of the British Transport Commission undertaking would be commercially unsound; but further increase in the autonomy of the Regions necessitates careful planning and safeguards of which account no doubt is taken by those who may suggest it. Some proposals for further decentralisation might not be desirable. Much depends on what is proposed; but until concrete suggestions are made, it is hard to see how the railway trades unions can assess the effects on their members. There seems to be a desire for "integration" of transport for its own sake.

Combined Rail-and-Road Vehicles

INTRODUCTION to this country of the Roadrailer design of freight vehicle described last week and demonstrated in prototype form recently at Marylebone Parcels Depot, London, is a bold step towards accelerating and making less costly the handling of door-to-door freight traffic over long distances. Before this development by the Pressed Steel Co. Ltd. in conjunction with British Railways, Eastern Region, and British Road Services, there have been no successful attempts to combine in one vehicle the flexibility of road transport in its collection and delivery functions with the speed and economy of railways for the trunk haul. Probably this is because heavy railway-vehicle designs cannot be adapted satisfactorily to run on the roads. By approaching the problem the opposite way, with a road vehicle semi-trailer as the basic vehicle and the minimum of modifications to make it suitable for railway use, it may now be shown that economy can be achieved both in building and operating costs.

Logical Successor to the Large Container

MORE important than the savings of cost and weight to be expected from large-scale use of Roadrailers is the flexibility of movement made possible by variety of the body designs prepared. These can be built to the requirements of most industries and trades, and should facilitate better through service than is possible now even with special containers. Also the risk of goods being damaged by shunting impacts is reduced by the fact that Roadrailer trains can never be sorted in conventional marshalling yards. The seven original prototype Railvans of the Chesapeake & Ohio Railway have an aggregate mileage of about 700,000 achieved during 18 month's use; they have been tested at speeds of up to 95 m.p.h. The Roadrailer, built under licence from the C. & O. Railway and engineered to British standards, has been tested for some 5,000 miles on roads and 2,000 on rail including runs at speeds of up to 85 m.p.h. with good stability. The ratio of over 2: 1 quoted in an editorial note last week is for the load/tare ratio; not the inverse as printed. Maximum axleload with loaded vehicles coupled for use on rail is 17 tons.

Advantages of Export Trade

THE clear exposition of the advantages of a good export trade contained in a National Union of Manufacturers booklet, "Exporting is Profitable," is worth reading by many people other than the smaller manufacturers whom it is intended to persuade. The pamphlet is the subject of brief notice on page 329. Export orders, it points out, are usually larger than

home orders, and are often placed when home trade is slack. Greater production with a more even flow through a factory results in lower production costs and spreads the overheads over a larger turnover. Each export market is "another basket for the production eggs." Any export door, moreover, which has been opened can be opened wider should business recede in the home or other markets; for example, in 1957–58 many firms would have been in serious trouble if the U.S.A. and Middle East markets had not been so buoyant. Trading in foreign markets adds to a firm's knowledge and experience. This often produces ideas for improving the design of a product and to new uses for it; and can even lead to better production methods. Contacts with other countries can result in the licensing of British products on a royalty basis or, in reverse, greater diversification by the manufacture of a foreign patent by the British firm; both operations can be very profitable.

Concrete Sleepers in Sweden

THE Swedish State Railways administration has been replacing wooden by concrete sleepers since 1957, and some 80 miles of the Stockholm-Gothenburg and Katrincholm-Malmo main lines are now laid with this type. This is perhaps remarkable in view of the wealth of timber in the Scandinavian and adjacent countries. However, the policy is being continued, and it is expected that by 1963 sufficient concrete sleepers will be in service on these lines to enable maximum speeds to be raised from 78 to 90 m.p.h.; reduced maintenance and smoother running are also to be expected. The concrete-sleepered track is prefabricated in 131-ft. lengths for relaying, the lengths being run out on special trolleys before being welded into the longest feasible lengths. This suggests that for the moment concrete-sleepered track is being confined to the south and central parts of the country, for certain technical problems have yet to be overcome before long welded rails are feasible in Lapland. Nevertheless an order was placed in 1959 for the supply of 80,000 type 101 concrete sleepers to be delivered annually until 1965. During the same period re-railing at a cost of about £1,076,000 is planned.

Electronics in Transport

THE very diversity of the applications of electronics in a large railway or transport organisation makes difficult a just appreciation of its growing importance, because it cannot be linked in any outstanding way with one or two departments. As an endeavour to disseminate information on the computing and control devices in use or projected, and to give a summary of what has been achieved or developed in other organisations, the Research Department of the British Transport Commission has begun the issue of a small publication *Transport Electronic News*, which is to appear at intervals of two months. How far electronics has progressed is shown clearly in the first issue, particularly in two articles. The first deals with the four weeks' course on generalised computer programmes arranged by the B.T.C. in conjunction with the Manchester College of Science and Technology, and of which there is probably no counterpart in this country. The second is a discussion on the training and examination of special computer maintenance engineers, with a hint that the time may not be far off when divisions of the B.T.C. must be prepared to undertake the maintenance of their own computers.

Third Class Sleeping Accommodation in India

THE Indian Minister of Railways, Mr. Jagjivan Ram, has announced that by mid-1961 all trains in India running 500 and more miles are to contain at least one three-tier third-class sleeping car, available to passengers travelling that whole distance, without any extra charge over and above the third-class fare. With this end in view 200 of these vehicles have been ordered for delivery by the middle of next year. The Minister also has stated that a more comfortable type of two-tier third-class coach, with sitting and sleeping accommodation, is proposed for day-and-night travel; it would be available for those travelling less than, and over, 500 miles at an extra charge of Rs. 3 (4s. 6d.) a night. At present three-tier cars are incorporated in eight pairs of long-distance trains, six on the broad- and two on the metre-gauge system. Though the berths and seats are distinctly hard, these vehicles provide more space for relaxation. Altogether additional stock of all kinds has made it possible to accommodate about 24 per cent more passengers on both gauges during the period of the Second Five-Year Plan.

Sea-going Train Ferries

IF the Government decides against the Channel Tunnel, the British Transport Commission will have to order replacements for some of its train ferries. As to the Dover-Dunkirk route, by which the ferryboats convey sleeping cars on the night and goods wagons on the day crossings, one may wonder whether, if there is to be no Channel Tunnel, any alteration will be made in the pattern of service. The "Night Ferry," with through sleeping cars between London and Paris and Brussels, gives a reliable service affording a night's rest and a saving in time; no other form of transport combines these advantages. The sea passage is completed with commendable punctuality in conditions, notably tides, more difficult than those encountered in operating the train ferries in the Baltic. One of the longer of these, from Trelleborg, in Sweden, to Sassnitz, in Eastern Germany, is over 60 miles long. A wagon ferry is reported to have been inaugurated between Miami, in Florida, and Puerto Matias de Galvez, in Guatemala—over 1,000 miles. As the gauge in Guatemala is 3 ft., the ferry, if in fact it conveys railway wagons, serves presumably to save one transhipment.

Graz-Koflach Centenary

THE only remaining Austrian private railway of any moment, the Graz-Koflacher Eisenbahn, celebrated its centenary earlier this year. It has been, and remains, one of the most notable of the smaller railways; indeed, the word astounding would be more applicable to some of its facets, including its locomotive stock. The lignite coal traffic is the mainstay of the line, but there is intense local passenger traffic, particularly between Graz, Lieboch and Koflach, now handled mainly by Verdingen diesel railbuses. The first section, opened to full service on April 3, 1860, was from Graz to Koflach, 25½ miles; the Lieboch-Wies line was opened in 1873, adding another 31 route miles, and the final Sulmtal line to Leibnitz dates from 1907, but was not absorbed into the G.K.B. until 1930. A large network of road buses and lorries is also operated today by the G.K.B. In 1872 to the then existing three passenger classes was added a fourth class, in simple cars having standing room only, but these cars were withdrawn in 1891. In 1878 the Austrian Südbahn took over the working, and in 1924 the Federal Railways took over operation, but only from January 1 to June 30, when the G.K.B. resumed operation of its own property. The Alpine Montangesellschaft became a majority shareholder in 1928.

Centenary Trains

THE British Transport Commission and British Railways are assiduous in mounting exhibitions: not merely permanent shows such as York Railway Museum, but also semi-permanent ones as in the board room at Euston and temporary ones exemplified by the well-arranged shows of rolling stock at Carlisle and Battersea in the last two or three years, and by the British contribution to the exhibition of aluminium rolling stock at Strasbourg in June. Further, almost invariably they do extremely well, and gain some revenue, in special trips over closed lines, or unusual lines, for various amateur railway and locomotive societies. All this is as it should be in a country which gave birth to the railway system. But in one respect foreign railways have observed—and gone one better. On the occasion of the centenary in July last of the international railway connecting Pontarlier (France) with Les Verrières (Switzerland) the local officers of the French National and Swiss Federal Railways not only had celebrations and an exhibition, but ran "centenary trains" over the border between the two towns named and gained substantial revenue.

Luminous Level Crossing Signs

TWO thousand level crossings in Canada are to be marked with new aluminium warning signs which shine brightly at night in the lights of approaching road vehicles. The Board of Transport Commissioners has ordered six railways, including

the Canadian Pacific and Canadian National, to erect these signs before April, 1961. The major share of the estimated cost of $200,000 is to be paid out of a railway level crossing fund, which will provide $80 of the estimated $100 cost for each crossing. This is the second step in a long-term programme, initiated by the Transport Commissioners in co-operation with the major railways, to place reflecting signs at all crossings not protected with automatic warning signs. Last year about 2,000 unprotected crossings were marked with luminous aluminium signs. Each year this number is to be placed until all crossings are marked with indicators visible at night. There are about 33,000 level crossings in the Dominion. The sign is the same as the X-shape wooden sign familiar in North America, except that it is made of aluminium and coated with a reflecting material. The words "railway crossing" or, in Quebec, "traverse de chemin de fer," remain in the same style and size.

Health and Industrial Organisation in Rhodesia

WITH the development of commercial and industrial activity in the Federation of Rhodesia & Nyasaland it has been recognised for some while the Federation must be above reproach in public health and factories legislation. Because of the wide geographical range of the railway, with its 31,000 employees, more particularly in the varying climates of the Rhodesias and Bechuanaland, control of pest, malaria and bilharzia is a special problem. To deal with this, and to ensure safety and prevent industrial accidents, a Health & Industrial Section has been formed within the Rhodesia Railways Medical Department under the Chief Medical Officer. The Medical Department will establish and maintain contact with the Federal Ministry of Health, the Territorial Department of Labour, and the public health departments of local authorities. Much of this work hitherto has been carried out by various railway and Government departments, and notably the Federal Department of African Affairs. Accident prevention and safety on the railway have been the concern of the office of the General Manager. The new centralised organisation will improve the service given in these matters to all railway departments and to the several authorities concerned along the line.

Britain's Railway Queen

THE importance attached by the management and employees of British Railways to the institution of Britain's Railway Queen was shown at the crowning at Manchester, last Saturday, of Miss Sheila Riordan, of London, as Queen for 1960–61, in succession to Miss Hazel Dobinson, of Darlington. An historical description of the office of Railway Queen and explanation of its significance as a factor productive of goodwill between railwaymen of all ranks and nations, were given in our February 21, 1958 issue, and the ceremony of crowning was described in our September 19 issue of that year. It was performed last week jointly by Sir Reginald Wilson, Member of the British Transport Commission and Chairman of the London Midland Area Board, and Mr. W. J. P. Webber, General Secretary of the Transport Salaried Staffs' Association. The 20,000 people who gathered at the Belle Vue Gardens included railwaymen of all ranks and from all parts of Britain. At a luncheon before the ceremony Sir Reginald Wilson drew attention to the unbroken succession of 30 Railway Queens, and to the way in which Miss Dobinson had carried out her exacting duties. The composition of the Railway Queen's Council, Mr. Webber stated, indicated common support of the institution by the railway unions: its Chairman, Deputy Chairman, and General Secretary were members respectively of the three unions: T.S.S.A., National Union of Railwaymen, and Associated Society of Locomotive Engineers & Firemen.

London Transport Steam Locomotives

THE end of London Transport Executive steam services on the Chesham branch of the Metropolitan Line last weekend is a reminder that the predominantly electrified London Underground system still has its own small fleet of 13 tank locomotives. One of these, No. L.44, an 0-4-4T built by the Metropolitan Railway at Neasden works in 1896, had a brief hour of glory last Saturday night, when it worked a commemorative train from Chesham to Chalfont & Latimer, the junction on the Aylesbury line. The steam locomotives are normally confined to hauling engineers' and similar trains, an intermittent type of duty for which L.T.E. finds them more economical than diesels, and to shunting in depots and yards. Power for the remaining steam passenger services on the Metropolitan Line is provided by British Railways. The present London Transport fleet includes three 0-4-4T "E" class engines, dating from 1896 and 1901, an "F" class 0-6-2T, built in 1901, and an 0-6-0T, built in 1899, all originally belonging to the Metropolitan Railway. Two 0-6-0 tanks formerly owned by the Metropolitan District Railway, and built in 1931, are the most modern L.T.E. steam locomotives.

New York Central Motive Power

INFORMATION on the present-day U.S.A. motive power is contained in the annual report for 1959 of the New York Central Railroad. The statistics given refer only to the N.Y.C., but this line may be taken, in regard to this matter, as representative of large Class I railroads, more particularly those in the Eastern States. At the beginning of 1959 the N.Y.C. accounts still showed an investment of $930,062 in steam locomotives, but at the end of the year nothing. On December 31, 1959, the N.Y.C. (including leased lines) had a stock of 2,011 diesel locomotive units, of which 640 were purely shunting power. But of this total only 248 units were fully owned; another 1,502 were held under equipment obligations and 261 were held under lease. There were also 80 electric locomotives in stock, but all of these were fully owned. Total investment in all these electric and diesel locomotives was given as $277,828,691, and total revenue mileage of locomotives, including yard work, was 65,765,987. As a general indication of the intensity of working and of the train loads, the gross ton-miles (short tons, and exclusive of locomotive weight) per freight train hr. averaged 57,159.

Main-line Electrification in Britain

MAIN-LINE electrification has been a major feature of British Railways modernisation plan and is undoubtedly one of the principal means of increasing efficiency and improving services. A new phase in implementing electrification plans began last Monday with the inauguration of the Manchester-Crewe main-line electrified services of the London Midland Region by Mr. Ernest Marples, Minister of Transport. This is the second and more important of the two pilot schemes for conversion at 25-kV. 50 cycles a.c. which were started soon after the British Transport Commission published its decision to adopt the high-voltage a.c. system for future main-line electrification except for extensions to the Southern Region third-rail network. The other a.c. pilot scheme completed is in the suburban area of the Eastern Region.

Although the Manchester-Crewe line is only 31 miles long, it forms the first stage of the Euston-Manchester and Liverpool scheme; the scheme which is the very essence of British Railways electrification plan. It has required a vast concentration of effort by all the railway planning and engineering departments and is an appropriate start to a project which could transform the operation of the whole main line. Work is already advancing north and south of Crewe, but there are fears that the Special Advisory Group appointed by the Government to advise on the structure, finance, and working of the British Transport Commission may recommend that further electrification be curtailed in favour of diesel traction.

Any major alteration in the present electrification programme would be regrettable from the view point of railway efficiency. Some £17,000,000 has been spent on the conversion of the Crewe-Manchester line, including rolling stock which will be used on the broader scheme. The line could continue to be used for suburban electrified services, but as it was planned as an essential part of an electrified main-line route a considerable amount of money would be lost. The Commission has pinned its faith on main-line electrification as the best way to reap a return on its capital expenditure. The project is part of a long-term plan to strengthen the position of British Railways and to assist industry, and the export position of British trade, by giving better service. To curtail the scheme in its present form would be a severe blow to the modernisation plan. Only

by completing the whole of the Euston-Birmingham-Manchester and Liverpool project can a real conclusion be drawn on the potential efficiency of the system.

With justifiable pride British Railways is preparing to show to a world-wide assembly of railway engineers, at its electrification conference next month, the confidence it has in the high-voltage a.c. system. It would indeed be regrettable if this confidence was undermined.

New Construction in Brazil

SHORTAGE of funds slowed down railway building in Brazil in 1959, but authority was reported recently to be awaited for commencement on work on various sections. The need for new railways to serve the rapidly expanding economy is admitted. Before the creation of the holding company, the Rede Ferroviaria Federal, S.A., all matters concerning the Federal railway system were dealt with by the National Railways Department (D.N.E.F.). The latter body now is mainly concerned with the building, or supervision, of construction by other bodies, of new lines on behalf of the Union Government, and is the technical organ of the Ministry of Communications & Public Works.

The D.N.E.F. is supervising construction of about 1,000 route miles of railway by private contractors and of some 720 miles by military engineering units. These include sections of the 5-ft. 3-in. gauge principal southern trunk line, which will shorten the distance between Sao Paulo and Porto Alegre, in the extreme south. One of these is the 180-mile stretch from Itangua, on the Sorocabana Railway, *via* Ponte Grossa to Engenheiro Bley, where it links up with the Parana-Santa Catarina Railway. When this section is completed the present line from Ponte Grossa to Engenheiro Bley, which is in poor condition, will be abandoned. The Papagaio viaduct, 1,520 ft. long, has been finished and work has started on the first of three other major bridges. The first 150 miles of track are stated to have been laid on the 400-mile section of the southern trunk line from Mafra to Mussum. In the State of Rio Grande do Sul, construction of a 90-mile link from Mussum to Passo Fundo involves 19 tunnels totalling five miles, and a large number of underline bridges. The lines being constructed to serve the new Federal capital of Brasilia include 53 miles of 5-ft. 3-in. gauge, including 1,120-ft. curves and gradients of 1 in 77, and a 100-mile section from Pires do Rio to Surubi with equally severe gradients and sharp curves.

The above are only a few of the many sections under construction. Work is proceeding on some 2,500 route miles of railway throughout the Federation, and the railway managements and technical staffs are ready to begin work on many more. The demands for motive power, rolling stock, and signalling and other equipment for these railways and to move the increasing traffic on existing lines in Brazil, must be on a large scale, and afford useful opportunities for orders for execution both in Brazil and overseas.

The Railway as Buyer

THE decisive role of South African Railways as buyers, in the economy of the Union, apart from providing transport, is stressed by Mr. D. H. C. du Plessis, General Manager of S.A.R., in his recent address to the South African National Development Foundation. The railways, he points out, are the largest single purchasers of South African manufactured products. The manufacture of goods wagons in the Union is possibly the most striking example. During the five-year period ended March 31, 1959, the latest for which figures are available, the South African Railways bought products of Union origin to the value of just under £100 million. Orders placed for goods wagons with South African manufacturers amounted to over £37 million. One of the firms pioneering in the manufacture of railway rolling stock was paid £15,264,883, and this concern, with many others, is currently engaged on executing orders placed by S.A.R. Only recently, a comparatively new firm was given a £10 million order for suburban electric passenger stock. The range of manufacture of railway equipment is being steadily expanded. As to railway electrical equipment, Mr. du Plessis states that the Union has made significant strides in recent years as a direct result of the policy of the railways to " buy South African " wherever possible. The electrical equipment for suburban passenger coaches, for example, used to be imported, but now many parts are being manufactured in the Union.

The policy of purchasing in South Africa wherever practicable has been consistently followed for many years. While the value of direct imports on railway account rose from £2,500,000 in 1938-39 to nearly £30 million in 1958-59, that is by twelve times, the value of local goods purchased during the same period advanced nearly 30-fold from £1,500,000 to some £43 million.

These facts cited by the General Manager of South African Railways should be considered by those responsible for decisions affecting the future of railways in Britain. The importance to British industry of British Railways as a purchaser is immense. It can be greater still if no halt is called to electrification and other projects which necessitate orders on a large scale from British manufacturers. Such buying is productive because it will enhance the efficiency—and, ultimately, the prosperity of our railways ; and it will assist industry by affording the continuity in production and the proving ground for motive power, rolling stock, and other railway equipment essential for capturing orders in increasingly competitive world markets.

Victorian Railways Improvement Plans

ALLOCATION to the Victorian Railways from the State Loan Works Fund of £7,550,000 has been announced by Sir Arthur Warner, Minister of Transport, Victoria. The largest single items of expenditure are £2,500,000 for rolling stock, and £1,000,000 for the 4-ft. 8½-in. gauge railway from Melbourne to Wodonga and Albury on the New South Wales border, to give through running between Melbourne and Sydney and other places over the standard-gauge New South Wales Government Railways; construction of this line is being accelerated. Other items of the development programme are the electric and diesel-electric locomotive depot at Dynon, near North Melbourne; abolition of level crossings; and improvements at Melbourne Spencer Street Station.

Some £900,000 is to be spent on building brake vans and goods wagons in railway workshops. Nearly £500,000 is allocated to a second batch of 30 " Harris " trains for the electrified suburban system. The first series of these will go into service by the middle of 1961. Some £558,000 is to be spent on more diesel-electric locomotives. During the year deliveries are expected of five " S " class 1,950-b.h.p. main-line diesel locomotives for use on the Melbourne-Albury standard-gauge line. Also the balance of an order for " W " class diesel-hydraulic locomotives will be delivered by Tulloch during the year. These will replace steam shunting engines at present in use.

Other items included in the works programme are: electrification of the outer suburban line between Upper Fern Tree Gully and Belgrave; and improved facilities at the Dynon goods terminal. At Melbourne Spencer Street, in preparation for standard-gauge operation, it will be necessary to carry out extensive alterations. It is planned eventually to build a new platform 1,350 ft. long parallel to the existing No. 1 platform for 4-ft. 8½-in. gauge trains. A third rail will also be added to the track at No. 1 platform so that it can be used by both standard and broad (5-ft. 3-in.) gauge trains. Most inter-state expresses arrive and depart from No. 1 platform. A fly-over is planned at North Melbourne to enable locomotives travelling between the depot and arrival or departure platforms for country trains to keep clear of suburban trains.

Besides work on level crossings on the standard-gauge railway £62,000 is to be spent on the abolition of level crossings. The Elsternwick and Newport crossing projects which are at present in progress are expected to be completed within the next 12 months and work will begin on abolishing the level crossing at Brooklyn. The latter is one of the six country level crossings recommended for abolition by the Level Crossings Committee in 1955 and is just beyond the Footscray suburban area where the Newport-Sunshine goods line cuts across the Melbourne-Geelong road. Work will also begin on the Strathmore crossing in the northern suburban area on the present main Sydney line. Some £70,000 is to be spent on installing boom barriers and flashing lights at other level crossings.

Because of pressure of funds needed for the standard-gauge project, expenditure on suburban improvements is to be cut

to £300,000 instead of more than twice that sum in a normal year. Expenditure on suburban works this year will be concentrated on completing automatic power signalling between Box Hill and Ringwood (£80,000) and work on the third track between Burnley and East Camberwell (£160,000).

Preliminary planning and site investigation for the proposed underground railway will begin this year. It will eventually be speeded up as engineering staff are released from standard-gauge work; £25,000 has been set aside for preparatory work out of the loan allocations.

Scottish Region Winter Passenger Services

IT is encouraging that the Scottish Region experiments with fast limited-stop express trains over two of its principal main lines have attracted sufficient patronage for them to be continued for the winter. These are the 8.5 a.m. and 5 p.m. 3-hr. restaurant car trains from Edinburgh Waverley to Aberdeen, and the corresponding return services at 7.30 a.m. and 4 p.m.; also the 8.45 a.m. and 5.30 p.m. 2½-hr. diesel multiple-unit trains (with miniature buffet) from Aberdeen to Inverness and the return services at 8.30 a.m. and 5.15 p.m. The decision to continue the latter as yet applies to the end of the year only, and was reached too late for the inclusion of these trains in the winter timetable book; but there are good prospects that they will become permanent.

The 5.25 p.m. from Edinburgh, connecting with the down "Flying Scotsman," during the summer has been a diesel train running only to Dundee, but now becomes once again a restaurant car train to Aberdeen, due there at 8.52 p.m. as compared with 9.11 p.m. last winter. The 9.40 a.m. from Aberdeen to Edinburgh starts at 9.45 a.m. and is accelerated 5 min.; the 11.10 p.m. diesel train from Edinburgh to Dundee runs 10 min. later throughout.

On the Edinburgh-Glasgow direct line the 9, 10.20 and 11 p.m. westbound trains are starting at 9.10, 10.10 and 11.10 p.m. respectively; eastbound, the 9.20 p.m. from Glasgow Queen Street to Edinburgh Waverley has been withdrawn and the 10.15 p.m. from Glasgow is starting at 10.25 p.m. and running *via* Falkirk Grahamston. On Sundays the whole service runs *via* Grahamston as usual, and from September 18 to March 26, 1961, inclusive, will use Buchanan Street station in Glasgow between 10 a.m. and 6 p.m. instead of Queen Street, without alteration of departure and arrival times.

On the Glasgow-Aberdeen main line, all the Sunday expresses will arrive at and depart from Queen Street instead of Buchanan Street until May 14 inclusive. As to other changes, the down "Postal" now runs 7 min. earlier from Stirling to Aberdeen, arriving at 8.17 instead of 8.24 a.m.; the down "Royal Highlander" reaches Inverness at 8.45 a.m., 14 min. earlier than last winter; but the 9.50 a.m. from Euston to Perth arrives 20 min. later, at 7.40 instead of 7.20 p.m. (27 min. later than last winter). Instead of the normal winter departure at 4.45 p.m., the evening Oban-Glasgow train (with the London sleeping car on Mondays) is continuing its summer 5.15 p.m. departure and running 30 min. later, reaching Glasgow at 9.30 p.m. Miniature buffet cars are now included in the 7.15 a.m. and 1.15 p.m. Glasgow Buchanan Street to Dundee, the 8.15 a.m. to Aberdeen, the 10 a.m. and 4 p.m. from Dundee and the 1.30 p.m. from Aberdeen.

Deceleration of the London trains continues, and this winter applies to both the West and East Coast routes. The general increment is 10 min. The 8.30 a.m. "Caledonian" and 10 a.m. "Royal Scot" thus are now allowed 7 hr. 25 min. to Euston, and the 1.30 p.m. (previously 1.15 p.m.) "Midday Scot" 7½ hr., as this train now stops additionally at Crewe. The down "Royal Scot" also for the first time stops at Preston, and is not due in Glasgow Central until 4.33 p.m.; the 12.50 p.m. (previously 1.5 p.m.) "Midday Scot" arrives at 8.15 p.m., and the 3.35 p.m. (previously 3.45) "Caledonian" at 11 p.m. The midday southbound service from Perth (previously 12.10 p.m. in winter and 12.20 p.m. in summer) starts at 12.15 p.m., and is 11 min. earlier into Euston at 10.5 p.m. The 12.10 midnight train from Euston to Glasgow is now due 20 min. later, at 9.50 a.m.

Most of the Sunday trains to and from the south are diverted from Glasgow Central to Buchanan Street in each direction until March 26, 1961; and this winter Glasgow St. Enoch station is remaining open on Sundays to accommodate the trains to and from Largs, Ardrossan, Ayr, Girvan, Stranraer, Kilmarnock, and Dumfries, and also the former Caledonian service to and from Gourock and Wemyss Bay. On Sundays in previous winters these have been dealt with at Glasgow Central, for economy, but during this winter the engineers desire exclusive possession of Central to facilitate work on the Cathcart Circle, Kirkhill, and Neilston electrification at 25kV. and 6·25kV., 50 cycles.

The Western Pacific Railroad

(*By a correspondent*)

THE Central Western Region of the U.S.A. railroads includes 53,310 miles of road, or about one-fourth of the total line-haul mileage in the country. In the northern part of the Region the Western Pacific Railroad operates 1,188 miles of road so energetically that it is setting the pace for the Union Pacific, Santa Fé, and other great railroads which wakened up in 1957 to the need for speeding up transcontinental freight train services. More than 10 years ago the Western Pacific was enterprising enough to join the Burlington and Rio Grande in running the "California Zephyr" between San Francisco and Chicago through 2,530 miles of country that often becomes wild and picturesque. From the first the venture succeeded and earned an annual revenue which never fell below $2,625,500 and rose to $3,006,500 in 1953, a fairly good year for both American and British Railways.

Leaving San Francisco about the same time as the "Flying Scotsman" departs from Kings Cross, the eastbound "Zephyr" climbs the Sierra Nevada Range for 314 miles, skirting the Feather River Canyon for a third of that distance, until it reaches a height of 4,830 ft. at Portola in the late afternoon. About midnight it arrives at Elko in Nevada, where the rails are laid at an altitude of 5,000 ft., and then drops down to an elevation of 4,230 ft. at Salt Lake City, Utah, between 5 and 6 a.m. That completes a stiff haul of 921 miles and the "Zephyr" passes into the Rio Grande's charge for the next stage of 570 miles to Denver, standing a mile high in Colorado.

Proud as the Western Pacific may be of its share in working a unique passenger service, it is primarily a freight carrier, last year's freight receipts of $49,245,710 representing 93 per cent of total operating revenues. Freight train traffic, consisting largely of manufactured goods and agricultural products, amounted to 7,149,000 tons and produced 3,538 million revenue ton miles, while gross ton miles totalled 8,241 million. All these figures were up on 1958, but down from 1957.

The trend of other operating statistics was changed by a decision of the Board to run more and shorter trains at a higher speed in order to strengthen its hold on traffic in an area where competition is rampant. Train miles were increased by 13·5 per cent and 15 per cent more diesel unit miles were worked. The net train load was reduced to 1,174 tons, against 1,322 in 1958 and 1,347 in 1957. Last year's light load moved at a speed of 28·3 miles an hour, compared with 26·4 in 1958 and 24·7 in 1957. The new policy entailed an advance of nearly 10 per cent in train operating costs above 1958, which the Board regard as "mandatory". For the third year in succession it paid dividends of $1,737,000, though the operating ratio rose from 75 to 78 per cent.

The Western Pacific hopes that a similar increase in transportation expenses will not take place in 1960. Meantime it had the satisfaction of setting up a new record for freight train speed last year. Previously the Union Pacific moved traffic faster than any other railroad in the States, but came second in 1959 with a speed of 27·8 miles an hour. Its train load was 1,322 tons and it operated 9,747 miles of road, turning out 88,263 gross ton miles in a train hour, or 17 per cent more than the Western Pacific output of 75,363. Productivity on the Santa Fé was slightly better, but the Western Pacific was well ahead of the Burlington, Rock Island, and Southern Pacific which serve far larger tracts of country and many centres of industry.

This article is based on the annual report of the Western Pacific for 1959—made attractive by eight topical illustrations of railroad operations—and on the bulletin of operating statistics for 1959–1958 published by the Bureau of Railway Economics, Association of American Railroads, in April.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

West Cumberland Diesel Services

September 5

SIR,—The article in your July 29 issue on the West Cumberland diesel services was of particular interest to me, because I had travelled from Carlisle to Keswick by the 5.5 p.m. diesel train only two or three weeks before.

The journey was spoiled by the need to detrain at Penrith while the train was shunted over to the Keswick line. This was unpleasant and tiresome on a wet and windy evening: just the conditions in which the railway should be showing an advantage over the private car. Some passengers were most vocal on this point.

There is no mention in your article of this practice of turning passengers out at Penrith, but I gather that it is normal custom. In that case something ought to be done about it, either by installation of a facing junction from the Carlisle direction or by permitting the passengers to remain in the train during shunting. Surely the risk is no greater, for example, than the accepted custom at Borough Market Junction, outside Cannon Street, where the normal over-run margin is dispensed with as a matter of daily practice ?

I am sure that regular users of the Carlisle–Keswick line trains would welcome a better arrangement at Penrith, a station which in any case is particularly lacking in comfort.

Yours faithfully,

G. P. J. DE CLERMONT

3 and 4, Crooked Lane,
London, E.C.4

Electrification Costs

September 6

SIR,—The report of the Select Committee on Nationalised Industries is confusing on the subject of the finances of British Railways. It indicates that costs are upwards of £160 million for the Euston–Birmingham–Manchester–Liverpool electrification.

Some of this cost surely would have to have been spent on renewals in arrears on this line at the time electrification work was started. Similarly, much of the work now being carried out " in connection with electrification " would be desirable whatever form of traction was contemplated. I refer particularly here to the re-modelling of stations and tracks, deepening of ballast, improvement of drainage, building of fly-overs, re-signalling, introduction of A.W.S., and rebuilding of motive power depots. These are desirable investments as part of the modernisation plan, whether or not electric or diesel traction is contemplated.

The actual cost of electrification—erection of overhead lines, sub-stations, new rolling-stock requirements and the lowering of track of erection of higher bridges—alone should be counted as the cost of conversion to electrification.

Yours faithfully,

E. DECREUS

29, Chadwick Road, London, E.11

Voltages for Railway Electrification

September 1

SIR,—As the writer of the letter to *The Guardian* referred to on page 247 of your August 26 issue, I would say that if the voltage of, say, 10 kV. were adopted, the need for the dual voltage equipment on vehicles would not arise. If 10kV. were the voltage chosen it would be desirable to have some tractors equipped with power factor improvement gear, such as synchronous motor-driven converters.

With such locomotives the overhead conductor would not have to be much larger in section than that at present used for the higher voltage. Furthermore, with the intense traffic of British Railways the shorter distance placing of transformer stations would not be a serious handicap.

What is now being realised is the fact that a.c. locomotives are really much better and lighter than comparable d.c. locomotives. This fact is enough to warrant the a.c. system. Twenty-five kV. is very desirable for railways in less developed countries than Britain.

Yours faithfully,

HERBERT CHARNLEY

Brook House,
Clayton-le-Woods, Chorley, Lancs.

Split Pins on Locomotives

September 2

SIR,—The Chief Inspecting Officer of Railways has stated that the failure of the motion parts in a " Britannia " class 4-6-2 locomotive, which caused an accident attended by five fatalities at Settle, in the London Midland Region, British Railways, on January 21, 1960, was initiated by the loosening of a bolt on a slide bar. This bolt, which had been found loose several times previously, formed part of an assembly comprising also a nut, washer, and split pin. It was found that no washer had been used under the nut and that " the split pin had not been replaced " when it was last tightened.

Apart from the fact that in the best practice split pins are never replaced, but a new one used each time, why do locomotives of such recent design use such archaic things as split pins?

Surely the British Transport Commission does not mistrust stiff nuts, which are so extensively used on aircraft in the most exacting conditions of stress and vibration? Had one been used on this assembly, this accident would probably not have occurred.

Yours faithfully,

CHRISTOPHER BELL

58, Kevington Drive,
Marlings Park, Chislehurst, Kent

The Waterloo-Hounslow Line

August 27

SIR,—I have been a traveller by the Hounslow line since 1921. The Public Relations Officer of the Southern Region, Mr. F. D. Y. Faulkner, stated in his letter in your August 5 issue that a fact-finding survey last year revealed that the public found the bus routes more convenient.

But why did the public find them so? Most people who work in the offices and factories on the Great West Road and at Kew, live in South-West Middlesex. At present they travel by trolleybus to Hounslow and change there to buses for another uncomfortable journey onwards. What they want is a direct service from Kew, Brentford, or Syon Lane to Feltham, Ashford, and Staines without the change at Whitton. Cannot the Hounslow trains *via* Brentford be continued to Staines? They will not be missed on their present up journey to Waterloo *via* Richmond—a line already well served.

It seems to be the Operating Department, with its freight trains in and out of Feltham Yard, which is the nigger in the woodpile.

Yours faithfully,

A. G. EVERETT

89, Grove Road, Hounslow, Middlesex

EASTERN REGION WINTER PASSENGER SERVICES.—The further increase in recovery times in the winter passenger service on the Great Northern main line of the Eastern Region, British Railways, was stated in the editorial article on page 297 of our September 9 issue to compensate for delays caused by reconstruction of Peterborough Station. It is necessary also because of the very heavy programme of engineering work on the line. Besides the re-construction work at Peterborough, there is track widening at Arlesey, Sandy, and Huntingdon, also work in the London suburban area in preparation for electrification.

THE SCRAP HEAP

In Good Taste

An enterprising ticket collector at Blackfriars Station beguiles the tedious hours of his Sunday duties with music of a classical nature from a transistor radio. Senior railway officials who have passed his barrier have offered no criticism.—*From the "Daily Mail."*

The "Jim Crow" Law (1900)

In the U.S. the colour question is always more or less in evidence . . . and the legislative experiments which have been made seem only to have given rise to further complications. The latest development is thus described by the Chicago *Railway Age*. Virginia Railways are already experiencing many troubles from the operation of the Act requiring separate compartments for coloured passengers, popularly known as the Jim Crow law.—*From "The Financial Times," of August* 31, 1900.

Old New Zealand Locomotive Preserved

An 80-year-old locomotive, one of the oldest in New Zealand, has been given to the Hastings Model Railway Club by the Hawkes Bay Farmers' Meat Company. The club hopes to have the veteran engine mounted permanently on public display. The locomotive, of the "D" class, was built by Neilson & Company of Glasgow, in 1880. It was first put into service on New Zealand Government Railways on May 21, 1881. In 1885, at New Plymouth, it hauled a 50-ton train at the then respectable speed of 20 m.p.h. In 1889, it was transferred to the stores branch of the New Zealand Government Railways and worked at the department's sawmill, Kakahi, from 1911. During its last week of service, the locomotive performed the not inconsiderable task of moving six refrigerated vans totalling 200 tons in the yards of the final owners, the Hawkes Bay Farmers' Meat Company. The total weight in working order was 17 tons and the original boiler pressure 130 lb. per sq. in.; in later years it was reduced to 100 lb. When the engine ceased duty in July it was replaced by a 94-h.p. diesel locomotive fitted with a special exhaust-fume eliminator to prevent contamination of meat.

Railway into Bridle Ride

The Isle of Wight Pony Club is reported to be considering conversion of abandoned stretches of railway into bridle rides. The lines concerned are those of the former Isle of Wight Central and Freshwater, Yarmouth & Newport Railways.

Shocking Sight

In 1837, when the first German railway was to be constructed between Nuremberg and Fürth, the Bavarian College of Medicine, on being consulted, pronounced the following expert opinion: "In the first place it is inadvisable to build railways at all; if, however, it is intended to do so, it will be necessary to erect a high wall of wooden planks to the left and to the right of the line, in order that passers-by may not suffer from nerve and train shock." When the line from Potsdam to Berlin was to be built, the Postmaster-General, Stengler, said: "I send two mail coaches a day to Potsdam and they are not full up. If these people are bent on wasting their money they might as well throw it out of the window without more ado."—*Practical Training in Thought* (*R. Steiner*).

Family Business

The Chairman, President, and three Vice-Presidents of one undertaking in the U.S.A., the Pearl Valley Railway, in the State of Mississippi, are named Crosby. A correspondent writes that the railway is shown in the *Official Guide* as having a Chairman, President, and five Vice-Presidents, though there are only 4.2 miles of track with one wholly-owned and one jointly-owned station, for goods traffic only. Our correspondent visualises commencement of operations on Monday morning as follows: "The locomotives (one) are attached to the wagons (if any), under the watchful eye of the depot master (Crosby V. E.). The train despatcher (Crosby L. O.) gives the right of way; the brakesman (Crosby T. L.) waves his green flag to the engineer (Crosby I. M.), with presumably Crosby D. H. as 'shot-gun' (armed guard). The two other Vice-Presidents (non-Crosbys) lean on their shovels further down the line. There still remains one executive, a Mr. Knight, who is the secretary of the company (also in charge of traffic, transportation, and accounting), and he no doubt is waiting in the local Wells Fargo office for a takeover bid from some more prosperous company, say the Mobile & Gulf Railroad Company, which, though under strength as regards Vice-Presidents, has 11 miles of track and three wholly-owned stations."

Diogenes of the Railway Works

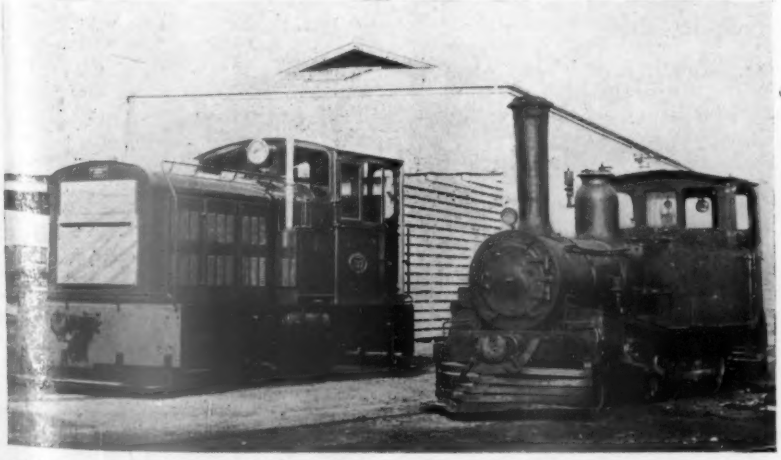
An employee at British Railways Derby Carriage & Wagon Works gave in his notice because he seldom had any work to do, and felt that he was not honestly earning his wage. His altruism appears to have been no less remarkable than the hedonism of his workmates who, according to a report in *The Daily Telegraph*, "went and sat in tubs all day long. . . . Nobody bothered . . . so long as everybody could have a nice soft time." Presumably the "tubs" had a special licence.

Testing Time

We recently spoke to passengers on a train bound for Cromer. The train was very full and it was one of those sticky days and nerves were inclined to be a bit edgy. As tactfully as we could we broached the question of railways in general and station staff in particular. We refrained from mentioning the fact that we were other than holidaymakers ourselves. Without exception the people to whom we spoke had nothing but praise for the service they were receiving and all were enthusiastic in their support for the men who, as one lady put it, "take so much trouble to help you when they are so busy themselves."—*From* (*British Railways*) "*Eastern Region News.*"

Railway "Hunting Box"

Hounds were often conveyed by train to meets in the last century. A correspondent states that one of the first horseboxes with accommodation for hounds ran on the Belfast & Ballymena Railway in 1849. It was designed by Charles Lanyon to the order of George Jackson Clarke, for Lord Massereene and Ferrard. It was known as a "hunting box." Four horses could ride in a compartment with an awning roof. The kennel portion was similar, with a slatted floor. There was a rack for compressed hay and an "automatic corn bin" for the horses. The vehicle was painted brown, lined in gold. The side panels bore the coat of arms of Viscount Massereene.



Eighty-year-old locomotive presented to the Hastings Model Railway Club, New Zealand, for preservation, alongside the diesel shunter which has replaced it

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NIGERIA

Transport Study

A large-scale study of transport in Nigeria was begun in July by a team of specialists from the Stanford Research Institute. The purpose of this study is to chart Nigeria's total transportation requirements as related to overall economic development in the next ten years.

EAST AFRICA

Circus Moved by Rail and Steamer

A circus from Brazil was carried by E. A. R. & H. from Dar es Salaam to Kampala, and thence *via* Nairobi to Mombasa, a journey of 1,500 miles by train and across Lake Victoria. The ss. *Nyanza* was chartered for the voyage from Mwanza in Tanganyika to Port Bell in Uganda. The circus included an elephant, carried in a high-sided wagon.

RHODESIA

Pay Increases for African Staff

Besides the £1 1s. 6d. a month minimum increase recently accorded to African staff of Rhodesia Railways, all married men with four or more years service received an additional increase of 10s. a month in family allowances; those with under four years service received an additional 12s. 6d. This brought the family allowance for 8,500 married employees with over four years' service up to £3 10s. and for the other group with shorter service, numbering 5,000, the family allowance rose to £2 10s. In addition some 2,000 employees were upgraded and well over half of these received further increases ranging from 10s. to more than £1 a month.

INDIA

Growth of Mineral Traffic

The movement of raw materials to steelworks on the South Eastern Railway, which carries a large proportion of this traffic, averaged 1,325 wagons a day in the period March–May of 1960, against 964 during the same months of 1959. Goods traffic generally, including coal, on the S.E.R. rose by 12 per cent during the three months to May 31, compared with this quarter of last year.

Integral Coach Factory Output

Forty-six coach bodies, a record, were turned out in June by the Shell Unit of the Integral Coach Factory, Perambur, near Madras. Monthly production is stated to have risen consistently since the factory was established in October, 1955. The target for the 12 months to September 30, 1960, is 550 coach bodies. For the following year it is 700, to be achieved by working double shifts. This production is necessary to meet demands under the third Five-Year Plan.

Garhara Transhipment Yard

Since the opening of the bridge over the Ganges at Mokameh, transhipment traffic between broad and metre gauge has made the yard at Garhara, on the North Eastern Railway, in North Bihar on the left bank of the river one of the busiest transhipment points in India. In March, 1960, the average number of broad-gauge wagons transhipped per day was 192 ; rose to 220 in May; and the present record is 336, achieved on June 12. The daily average for June was 235. Before the bridge was built, the highest number of wagons transhipped in a day at Mokameh Ghat, on the right bank of the Ganges, was 117. This involved ferrying of metre-gauge vehicles over the river.

VICTORIA

Inter-State Travel Facilities

Thirty-one additional inter-state trains for Adelaide and Sydney will leave Melbourne during the Christmas and New Year holidays. Booking to inter-state capitals opened in June, and advance reservations have already necessitated duplication of many trains. Besides the inter-state booking facilities at Spencer and Flinders Street Stations, Melbourne, at the Victorian Government Tourist Bureau, and at authorised travel agents, 17 Melbourne suburban stations can now complete travel arrangements to stations in other Australian States.

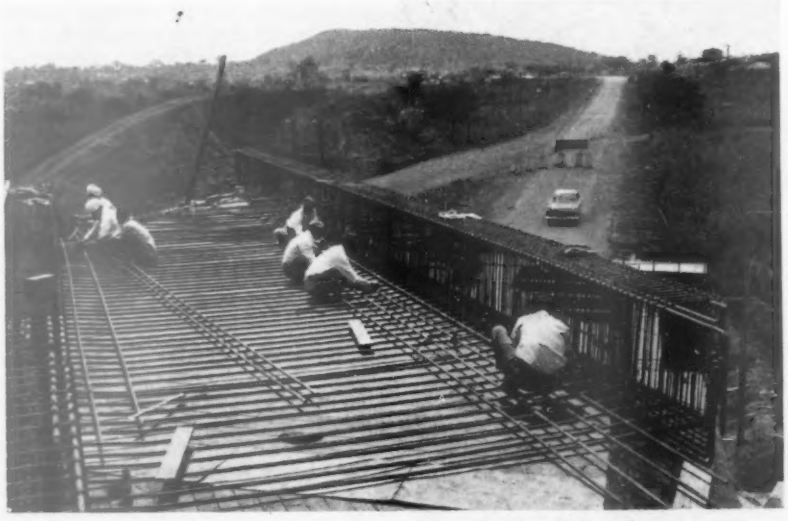
Progress on Standard-gauge Line

Despite cold weather, heavy frosts and soaking rains, work on the 4-ft. 8½-in. gauge line from Wodonga to Melbourne has been accelerated, and good progress has been made recently. Major earthworks are near completion; work is in progress on many bridges; and several miles of track have been laid. Over 650 men are working on the 176½ miles of new track between the Melbourne suburb of Jacana and Wodonga. Between Broadmeadows and Seymour, earthworks are now 60 per cent, and between Seymour and Wodonga, 95 per cent, completed. Over 1¼ million cu. yd. of filling have been placed in position between Seymour and Wodonga, including work completed in the Winton, Bowser, Springhurst, Chiltern, and Barnawatha station yards. About 500,000 cu. yd. of filling have been used between Broadmeadows and Seymour, including work in the Heathcote Junction yard.

Work on Bridges and Culverts

Ninety-five per cent of the work on bridges and culverts between Broadmeadows and Wodonga, on the standard-gauge line, has been completed. All the bridge steelwork ordered for the project from the New South Wales Government Railway has been delivered and approximately 70 per cent placed at locations. A 10-ton diesel crane is placing steelwork between Seymour and Wodonga. All the steel required for bridges between Wodonga and Euroa has been placed in position. Of the five major bridges, work at Reedy Creek, Wangaratta, had been completed. Work was about to be completed recently on the

New Construction in Uganda



Skew bridge over Tororo-Jinja road at Magamaga, on Nsinze-Jinja cut-off line, East African Railways & Harbours, showing re-inforcement of concrete girders and decking

bridge at the Ovens River, Wangaratta, and the Broken River, Benalla. The bridge over the Seven Creeks at Euroa is well in hand, and at the Hughes Creek bridge at Avenel, the concrete supporting structures are complete and ready for the steel girders. Near Melbourne, a retaining wall on the Broadmeadows side of Jacana has been completed. Work has begun on the construction of the flyover for the new standard-gauge lines to connect with the existing goods line between Broadmeadows and Albion, one track of which will be converted to 4-ft. 8½-in. gauge.

CANADA

High-capacity Tank Wagons

Regular shipments of phenol, a chemical used in the manufacture of plywood in British Columbia, have been started by B. A. Shawinigan Limited. Phenol is moved from the Shawinigan plant at Montreal to British Columbia by the Canadian National Railways in 20,000-gal. tank wagons. These were built in Canada and leased from the Canadian General Transit Co. Ltd. by B. A. Shawinigan Limited. They are stated to be the largest of their type built and leased in Canada for trans-continental service. They are 52 ft. long and can carry a load of 110 tons.

C.P.R. Revenue in 1959

Operating revenue per mile of line worked by the Canadian Pacific Railway in 1959 averaged $30,646, an increase of 2·5 per cent from $29,901 for the preceding year. The total operating revenue rose to $523,915,000 (from $511,191,000 in 1958) and operating expenses to $486,251,000 (from $473,190,000). The mileage of line operated was 17,096, the figure being unchanged from the previous year.

Revenue freight carried in 1959 was 57,879,000 tons, against 54,367,000 in 1958 and the number of revenue passengers decreased to 7,740,000 from 7,746,000. The average revenue per ton of freight fell to $7·02 from $7·24 and per passenger to $4·29 from $4·57 in 1959.

UNITED STATES

Pennsylvania Railroad Strike Ends

The strike on the Pennsylvania Railroad, which was recorded in our September 9 issue, ended on September 12 after protracted negotiations in Philadelphia between the transport workers' union and the management. Details of the settlement are not yet available, but it is reported that both the union and the management are satisfied with the terms agreed upon.

Transfer of Class I Railroad

The Pennsylvania and Santa Fe Railroads have, with the approval of the I.C.C. and the Supreme Court, obtained joint financial control of the 240-mile Toledo, Peoria & Western Railroad, running east to west across Illinois. This transfer of control has the potentiality of using the line to expedite transcontinental shipments between major railroads of the East and West, and without discrimination between the traffics passing between the 17 railroads which connect with the T.P.W.R.R.

WESTERN GERMANY

Car Hire Service

The Federal Railway motorcar hire service is now in operation in 31 large towns. Chauffeur-driven or self-drive cars can be ordered to meet trains from any other station. A wide range of makes of car is available.

Motorcars by Express Goods Service

In view of the success with the car/sleeper expresses which operated jointly by the German Federal and Belgian National Railways, the German Federal Railway has introduced, for a trial period, conveyance of motorcars by express goods trains on open double-deck wagons. On presentation of two ordinary or reduced return tickets, the cars are accepted for loading on the Duisburg-Essen West-Hagen-Cologne Gereon and Munich service. The cost of conveyance is uniform: differences in weight and lengths of cars are not considered. The owner must drive his car on and off the ramp at his own risk, and must travel by passenger train to or from Munich. He may not travel by the goods train in which the car is conveyed.

Publications Received

Exporting is Profitable. London: The National Union of Manufacturers, 6, Holborn Viaduct, E.C.1. No price stated.—This booklet is intended mainly to draw the attention of smaller manufacturers to the benefits achieved by smaller firms which have taken the advice of the N.U.M. on their export problems. Although it is preaching to the converted as regards most suppliers of railway material and equipment, the clear rehearsal of arguments is a useful reminder. It deals succinctly with three major supposed disadvantages of exporting: competition from local production, delay in payment, and selling at a distance. The advantages are described clearly. Further sections describe the services given by the N.U.M. for its members through its Export Assistance Department; what the Union can do for new entrants; and what it has already done.

Gland Packings.—In terms of size and cost a gland packing is an almost insignificant component compared with the equipment in which it is used, but if the gland fails to seal the fluid or gas there may be damage to plant or danger to personnel. The choice of correct packings from the many types and sizes of material available to suit specific applications has been greatly simplified by this 58-page reference book published by Crane Packing Limited. The arrangement enables the many variable factors which must be considered to be taken one by one in a logical sequence. A selection guide lists over 550 fluids and gases. There are nine main reference sections in each of which gland packings are grouped under headings relating to the maximum temperatures at which they can be used. Contents also include notes on the factors which govern design and performance and on the use of combination assemblies to suit service conditions which are not met by any one type of packing. Copies may be obtained free of charge from Crane Packing Limited, Slough, Bucks.

Transport Electronics News.—This first issue of a new bulletin from the Research Department of the British Transport Commission is the subject of editorial comment on page 322. Copies can be obtained from the Press Officer of the B.T.C. at 222 Marylebone Road, London, N.W.1.

C.F.F. Electrification Achevée (Swiss Federal Railways Electrification Completed). Berne: General Secretariat of the Swiss Federal Railways. 140 pp. Illustrated. Price 9 francs.—To commemorate the event indicated by its title, earlier in the summer of 1960, this brochure describes the progress and development of electric traction on the Swiss Federal Railways in 12 articles, with many technical data and illustrations. A German edition is understood to be available at the same price.

Wimet Cutting.—Results of a comprehensive study of the machining of steels with Wimet tungsten-carbide tipped milling cutters is contained in Wimet Technical Bulletin dealing with the new grade XL35 material. Copies may be obtained from Wickman Limited Coventry.

Guide to Magnetic Work-holding.— Magnetic chucks have been used for many years, but lack of technical information on magnetic work-holding has restricted its development. James Neill & Co. (Sheffield) Ltd. has assembled practical information, based on its own experience with magnetic chucks, in its "Users' Handbook." The booklet is illustrated with diagrams. Copies are obtainable free from James Neill & Co. (Sheffield) Ltd., Sheffield 11, tel. 26781.

F.A.G. Ball and Roller Bearings.— Dimensions and weights of many types of F.A.G. ball and roller bearings are catalogued in this 150-page handbook—Metric and English sizes are dealt with individually in separate sections. Also described are plummer blocks and axlebox housings, adaptor sleeves, withdrawal sleeves, and locking nuts and washers. A useful feature is a table showing metric equivalents for British Standard tolerances in inches applying to both radial and axial bearings. Copies may be obtained from the F.A.G. Bearing Co. Ltd., 69, Temple Street, Wolverhampton, or Kugelfischer Georg Schäfer & Company, Schweinfurt, Germany.

OVERSEAS RAILWAY AFFAIRS

(*From our correspondents*)

NIGERIA

Transport Study

A large-scale study of transport in Nigeria was begun in July by a team of specialists from the Stanford Research Institute. The purpose of this study is to chart Nigeria's total transportation requirements as related to overall economic development in the next ten years.

EAST AFRICA

Circus Moved by Rail and Steamer

A circus from Brazil was carried by E. A. R. & H. from Dar es Salaam to Kampala, and thence *via* Nairobi to Mombasa, a journey of 1,500 miles by train and across Lake Victoria. The ss. *Nyanza* was chartered for the voyage from Mwanza in Tanganyika to Port Bell in Uganda. The circus included an elephant, carried in a high-sided wagon.

RHODESIA

Pay Increases for African Staff

Besides the £1 1s. 6d. a month minimum increase recently accorded to African staff of Rhodesia Railways, all married men with four or more years service received an additional increase of 10s. a month in family allowances; those with under four years service received an additional 12s. 6d. This brought the family allowance for 8,500 married employees with over four years' service up to £3 10s. and for the other group with shorter service, numbering 5,000, the family allowance rose to £2 10s. In addition some 2,000 employees were upgraded and well over half of these received further increases ranging from 10s. to more than £1 a month.

INDIA

Growth of Mineral Traffic

The movement of raw materials to steelworks on the South Eastern Railway, which carries a large proportion of this traffic, averaged 1,325 wagons a day in the period March–May of 1960, against 964 during the same months of 1959. Goods traffic generally, including coal, on the S.E.R. rose by 12 per cent during the three months to May 31, compared with this quarter of last year.

Integral Coach Factory Output

Forty-six coach bodies, a record, were turned out in June by the Shell Unit of the Integral Coach Factory, Perambur, near Madras. Monthly production is stated to have risen consistently since the factory was established in October, 1955. The target for the 12 months to September 30, 1960, is 550 coach bodies. For the following year it is 700, to be achieved by working double shifts. This production is necessary to meet demands under the third Five-Year Plan.

Garhara Transhipment Yard

Since the opening of the bridge over the Ganges at Mokameh, transhipment traffic between broad and metre gauge has made the yard at Garhara, on the North Eastern Railway, in North Bihar on the left bank of the river one of the busiest transhipment points in India. In March, 1960, the average number of broad-gauge wagons transhipped per day was 192 ; rose to 220 in May; and the present record is 336, achieved on June 12. The daily average for June was 235. Before the bridge was built, the highest number of wagons transhipped in a day at Mokameh `Ghat, on the right bank of the Ganges, was 117. This involved ferrying of metre-gauge vehicles over the river.

VICTORIA

Inter-State Travel Facilities

Thirty-one additional inter-state trains for Adelaide and Sydney will leave Melbourne during the Christmas and New Year holidays. Booking to inter-state capitals opened in June, and advance reservations have already necessitated duplication of many trains. Besides the inter-state booking facilities at Spencer and Flinders Street Stations, Melbourne, at the Victorian Government Tourist Bureau, and at authorised travel agents, 17 Melbourne suburban stations can now complete travel arrangements to stations in other Australian States.

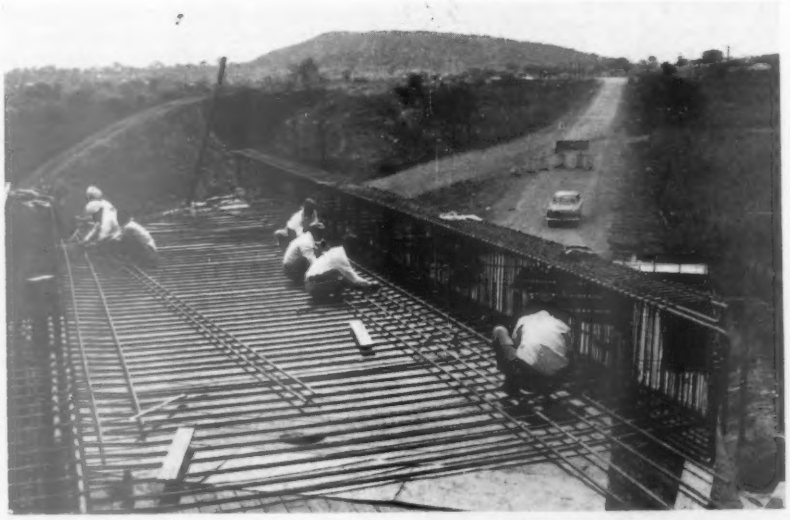
Progress on Standard-gauge Line

Despite cold weather, heavy frosts and soaking rains, work on the 4-ft. 8½-in. gauge line from Wodonga to Melbourne has been accelerated, and good progress has been made recently. Major earthworks are near completion; work is in progress on many bridges; and several miles of track have been laid. Over 650 men are working on the 176½ miles of new track between the Melbourne suburb of Jacana and Wodonga. Between Broadmeadows and Seymour, earthworks are now 60 per cent, and between Seymour and Wodonga, 95 per cent, completed. Over 1¼ million cu. yd. of filling have been placed in position between Seymour and Wodonga, including work completed in the Winton, Bowser, Springhurst, Chiltern, and Barnawatha station yards. About 500,000 cu. yd. of filling have been used between Broadmeadows and Seymour, including work in the Heathcote Junction yard.

Work on Bridges and Culverts

Ninety-five per cent of the work on bridges and culverts between Broadmeadows and Wodonga, on the standard-gauge line, has been completed. All the bridge steelwork ordered for the project from the New South Wales Government Railway has been delivered and approximately 70 per cent placed at locations. A 10-ton diesel crane is placing steelwork between Seymour and Wodonga. All the steel required for bridges between Wodonga and Euroa has been placed in position. Of the five major bridges, work at Reedy Creek, Wangaratta, had been completed. Work was about to be completed recently on the

New Construction in Uganda



Skew bridge over Tororo-Jinja road at Magamaga, on Nsinze-Jinja cut-off line, East African Railways & Harbours, showing re-inforcement of concrete girders and decking

bridge at the Ovens River, Wangaratta, and the Broken River, Benalla. The bridge over the Seven Creeks at Euroa is well in hand, and at the Hughes Creek bridge at Avenel, the concrete supporting structures are complete and ready for the steel girders. Near Melbourne, a retaining wall on the Broadmeadows side of Jacana has been completed. Work has begun on the construction of the flyover for the new standard-gauge lines to connect with the existing goods line between Broadmeadows and Albion, one track of which will be converted to 4-ft. 8½-in. gauge.

CANADA

High-capacity Tank Wagons

Regular shipments of phenol, a chemical used in the manufacture of plywood in British Columbia, have been started by B. A. Shawinigan Limited. Phenol is moved from the Shawinigan plant at Montreal to British Columbia by the Canadian National Railways in 20,000-gal. tank wagons. These were built in Canada and leased from the Canadian General Transit Co. Ltd. by B. A. Shawinigan Limited. They are stated to be the largest of their type built and leased in Canada for trans-continental service. They are 52 ft. long and can carry a load of 110 tons.

C.P.R. Revenue in 1959

Operating revenue per mile of line worked by the Canadian Pacific Railway in 1959 averaged $30,646, an increase of 2·5 per cent from $29,901 for the preceding year. The total operating revenue rose to $523,915,000 (from $511,191,000 in 1958) and operating expenses to $486,251,000 (from $473,190,000). The mileage of line operated was 17,096, the figure being unchanged from the previous year.

Revenue freight carried in 1959 was 57,879,000 tons, against 54,367,000 in 1958 and the number of revenue passengers decreased to 7,740,000 from 7,746,000. The average revenue per ton of freight fell to $7·02 from $7·24 and per passenger to $4·29 from $4·57 in 1959.

UNITED STATES

Pennsylvania Railroad Strike Ends

The strike on the Pennsylvania Railroad, which was recorded in our September 9 issue, ended on September 12 after protracted negotiations in Philadelphia between the transport workers' union and the management. Details of the settlement are not yet available, but it is reported that both the union and the management are satisfied with the terms agreed upon.

Transfer of Class I Railroad

The Pennsylvania and Santa Fe Railroads have, with the approval of the I.C.C. and the Supreme Court, obtained joint financial control of the 240-mile Toledo, Peoria & Western Railroad, running east to west across Illinois. This transfer of control has the potentiality of using the line to expedite transcontinental shipments between major railroads of the East and West, and without discrimination between the traffics passing between the 17 railroads which connect with the T.P.W.R.R.

WESTERN GERMANY

Car Hire Service

The Federal Railway motorcar hire service is now in operation in 31 large towns. Chauffeur-driven or self-drive cars can be ordered to meet trains from any other station. A wide range of makes of car is available.

Motorcars by Express Goods Service

In view of the success with the car/sleeper expresses which operated jointly by the German Federal and Belgian National Railways, the German Federal Railway has introduced, for a trial period, conveyance of motorcars by express goods trains on open double-deck wagons. On presentation of two ordinary or reduced return tickets, the cars are accepted for loading on the Duisburg-Essen West-Hagen-Cologne Gereon and Munich service. The cost of conveyance is uniform: differences in weight and lengths of cars are not considered. The owner must drive his car on and off the ramp at his own risk, and must travel by passenger train to or from Munich. He may not travel by the goods train in which the car is conveyed.

Publications Received

Exporting is Profitable. London: The National Union of Manufacturers, 6, Holborn Viaduct, E.C.1. No price stated.—This booklet is intended mainly to draw the attention of smaller manufacturers to the benefits achieved by smaller firms which have taken the advice of the N.U.M. on their export problems. Although it is preaching to the converted as regards most suppliers of railway material and equipment, the clear rehearsal of arguments is a useful reminder. It deals succinctly with three major supposed disadvantages of exporting: competition from local production, delay in payment, and selling at a distance. The advantages are described clearly. Further sections describe the services given by the N.U.M. for its members through its Export Assistance Department; what the Union can do for new entrants; and what it has already done.

Gland Packings.—In terms of size and cost a gland packing is an almost insignificant component compared with the equipment in which it is used, but if the gland fails to seal the fluid or gas there may be damage to plant or danger to personnel. The choice of correct packings from the many types and sizes of material available to suit specific applications has been greatly simplified by this 58-page reference book published by Crane Packing Limited. The arrangement enables the many variable factors which must be considered to be taken one by one in a logical sequence. A selection guide lists over 550 fluids and gases. There are nine main reference sections in each of which gland packings are grouped under headings relating to the maximum temperatures at which they can be used. Contents also include notes on the factors which govern design and performance and on the use of combination assemblies to suit service conditions which are not met by any one type of packing. Copies may be obtained free of charge from Crane Packing Limited, Slough, Bucks.

Transport Electronics News.—This first issue of a new bulletin from the Research Department of the British Transport Commission is the subject of editorial comment on page 322. Copies can be obtained from the Press Officer of the B.T.C. at 222 Marylebone Road, London, N.W.1.

C.F.F. Electrification Achevée (Swiss Federal Railways Electrification Completed). Berne: General Secretariat of the Swiss Federal Railways. 140 pp. Illustrated. Price 9 francs.—To commemorate the event indicated by its title, earlier in the summer of 1960, this brochure describes the progress and development of electric traction on the Swiss Federal Railways in 12 articles, with many technical data and illustrations. A German edition is understood to be available at the same price.

Wimet Cutting.—Results of a comprehensive study of the machining of steels with Wimet tungsten-carbide tipped milling cutters is contained in Wimet Technical Bulletin dealing with the new grade XL35 material. Copies may be obtained from Wickman Limited Coventry.

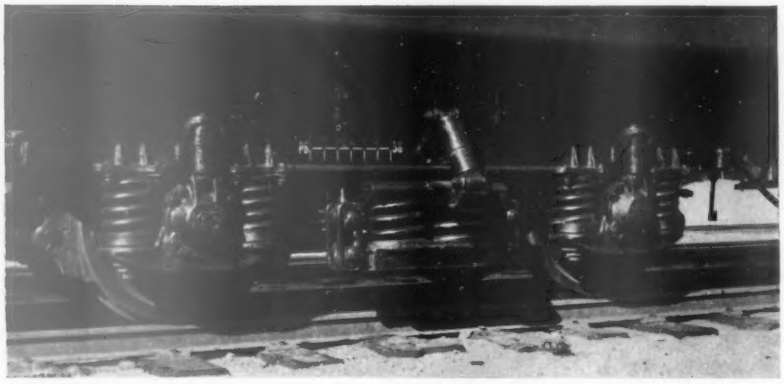
Guide to Magnetic Work-holding.— Magnetic chucks have been used for many years, but lack of technical information on magnetic work-holding has restricted its development. James Neill & Co. (Sheffield) Ltd. has assembled practical information, based on its own experience with magnetic chucks, in its "Users' Handbook." The booklet is illustrated with diagrams. Copies are obtainable free from James Neill & Co. (Sheffield) Ltd., Sheffield 11, tel. 26781.

F.A.G. Ball and Roller Bearings.—Dimensions and weights of many types of F.A.G. ball and roller bearings are catalogued in this 150-page handbook—Metric and English sizes are dealt with individually in separate sections. Also described are plummer blocks and axle-box housings, adaptor sleeves, withdrawal sleeves, and locking nuts and washers. A useful feature is a table showing metric equivalents for British Standard tolerances in inches applying to both radial and axial bearings. Copies may be obtained from the F.A.G. Bearing Co. Ltd., 69, Temple Street, Wolverhampton, or Kugelfischer Georg Schäfer & Company, Schweinfurt, Germany.

Body Rolling as Influenced by Bogie Suspension—1

Considerations of design variables affecting the angle of roll of bogie vehicles

By J. L. Koffman



Standard Russian coach bogie with divided bolster swing links

THE gradual increase of speeds and the much more rapidly increasing demand for improved riding qualities has focused the attention of vehicle designers on a rational evolution of suspension design. The necessity to do so is further reinforced by the requirements on electrified lines for the pantograph not to leave the overhead laterally or to move more than permitted by loading-gauge requirements, tunnel clearances, or by the width of the contact strip or pan *vis-à-vis* the stagger of the overhead.

As far as passenger vehicles are concerned, lateral displacement is limited by maximum acceleration as well as by physical limits set by the loading gauge. Extensive tests carried out by Professor Dr. K. Pflanz, of the Austrian Federal Railways, have shown that passengers can withstand steadily applied lateral accelerations of up to about 0·07g.

Lateral Oscillations of 0·1g.

Tests carried out by British Railways on vehicles of different types (1) have shown that lateral oscillations of 0·1g. and sometimes higher peak values can be encountered in service, but the duration of the peaks is so short that they are not likely to displace the vehicle body to anything like the corresponding amount. Nevertheless, it will be prudent to assume an unbalanced lateral force of 0·1g. applied at the centre of gravity of the vehicle body in the case of both coaches and locomotives.

As the quest for comfort encourages vehicle builders to make coach bodies as wide as possible, it will be desirable, for average conditions, for the lateral displacement at any point along the vehicle side not to exceed 2 to 3 in. or less, depending on loading-gauge requirements.

If it is assumed that this displacement is the result of body swaying, i.e., lateral displacement on the swing links and simultaneous roll on the bolster springs, then it is possible for the approximate conditions to be determined readily.

Analysis of vehicle tests has shown that, with conventional designs, the vehicle body rolls about the top of the (helical) bolster springs. Depending on the design, this is 2 to 3 ft. above the rail level and, for the British Railways standard coach, this distance amounts to about 2 ft. With the cantrail some 10 ft. 6 in. above rail level and a displacement of 3 in., the maximum angular displacement will be $\beta = 3/[(10{\cdot}5 - 2) \times 12] = 0{\cdot}026$ radians. If the 3-in. displacement is to include a lateral displacement of 1 in., then the permissible value of β is reduced to 0·02 radians, and so on.

Tests carried out with modern coaches running through curves at a steady speed resulting in an unbalanced lateral force equivalent to 0·1g. show that the angular displacement varies between 0·019 and 0·032 radians, depending on design parameters, and that these values increase by about 0·002 to 0·003 radians at 100,000 miles. It may be mentioned that, with some modern bogie locomotives using laminated bolster springs and operating at speeds of up to 90 m.p.h., the angle of roll on straight track was found not to exceed about 0·005 radians.

Vehicle ride considerations (2) require relatively higher values of static spring deflections. Thus, with coaches, 3·5 to 4 in. should be aimed at with the bolster springs as compared with about 1·5 to 2 in. for the primary suspension. The roll stiffness of the primary (c_a) and bolster (c_b) spring assembly of one bogie is:

$c_a = c_1 l_1^2/4$ [t.ft./radian]

and $c_b = c_2 l_2^2/4$ [t.ft./radian]

respectively, while for both, the primary and secondary suspension combined:

$$c_t = \tfrac{1}{4} \times \frac{c_1 l_1^2 \; c_2 l_2^2}{c_1 l_1^2 + c_2 l_2^2} \text{ [t.ft./radian]}$$

where: c_1[t./ft.] and c_2 [t./ft.] is the total vertical rate of the primary and secondary springs of one bogie respectively, and l_1 [ft.] and l_2 [ft.] the lateral distance between the centre lines of the spring assembly or the spring base. The angle of roll is given by:

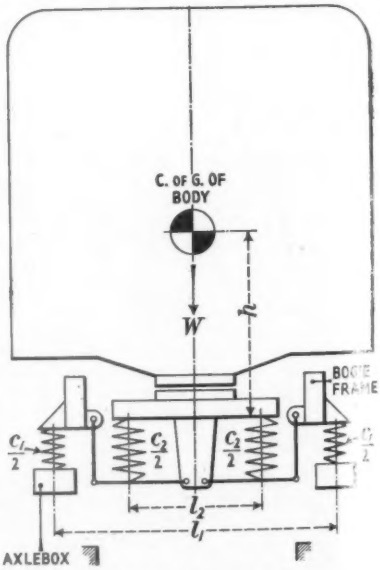
$$\beta = \frac{Ph}{2c - Wh} \text{ [radians]}$$

where: P [t] is the total unbalanced force, applied at the c. of g. of the body, h [ft.] the distance from the axis of rotation (roll) to centre of gravity of vehicle body, $c = c_b$ or $c = c_t$ and W[t] the body weight (2).

Effect of Sprung Bogie Component

For more exact determination, allowance must be made for the effect of the sprung bogie component (3). While the values of c_1 and c_2 must be chosen on the basis of their effect on the ride as well as the track and l_1 is usually decided by the distance between the axleboxes, particular attention must be drawn to the fact that the magnitude of l_2 is of paramount importance as far as c_2 and c_t are concerned.

To illustrate this point, assuming identical values for c_2 with l_2=6 ft. 6 in., the value of c_b will be $(6{\cdot}5/4{\cdot}5)^2 = 2{\cdot}1$ times higher than with l_2=4 ft. 6 in. Yet even now new designs are perpetrated with the bolster springs undesirably close to each other and consequently stiffened to counteract undue roll at the



$$M_b = \left[\frac{c_2}{2}\left(\frac{l_2}{2}\right)^2 + \frac{c_2}{2}\left(\frac{l_2}{2}\right)^2\right]\beta$$

$$c_b = \frac{M_b}{\beta} = 2\frac{c_2}{2}\left(\frac{l_2}{2}\right)^2 = \frac{c_2 l_2^2}{4}$$

Fig. 1—Bogie spring system

expense of the riding qualities in terms of oscillation pattern in the vertical plane (bouncing and pitching).

The accompanying table summarises the values of l_1, l_2, c_1, c_2 and c_t for a number of coach, railcar, and diesel, as well as electric locomotive bogies. The value of h in the equation for β represents the distance between the top of the helical bolster springs and the centre of gravity of the vehicle body. The centre of gravity of the body is about 5·8 ft. above rail level for the standard British Railways coach, 6 ft. for lightweight railcar trailer and 5 ft. for the power car.

British Railways Locomotives

In the case of British Railways diesel and electric locomotives, the relevant value is about 6·5 ft. compared with about 6·75 to 7·7 ft. for the bodies of Continental electric locomotives and 5·5 to 6 ft. for diesel-hydraulic locomotives. As far as passenger-carrying vehicles are concerned, it should be noted that the value of h will be increased slightly with load as the centre of gravity of seated passengers is about 25 in. above floor level. The calculated values for β apply for P=0·1W[t] and empty coaches.

When considering new designs, β should be also determined at full load and overload. In case of excessively high values, use can be made of bolster springs with carefully proportioned non-linear characteristics resulting in increased c_2 values with increasing loads.

The roll stiffness of coach, railcar and locomotive bogie suspensions and the angle of roll (for one).

It might be mentioned that, as far as absence of roll and swaying in operation is concerned, coaches 1, 2, 5, 6, 16 and locomotives 18, 22, 23, and 24 are particularly worthy of attention.

It will be noted that, with coach bogies, roll resistance c_b of the bolster suspensions is in the order of 350 to 400 [t.ft. per rad.] while the value of c_t is about 220 to 260 [t.ft. per rad.], respectively.

It was possible to check at least some of the calculated values of β with the aid of experiments. Thus, for the calculated values of 0·02, 0·027, 0·0195, 0·027, 0·025, 0·02, 0·024, and 0·027 radians (coaches 1 to 8), the experimentally-determined values were 0·021, 0·023, 0·019, 0·03, 0·028, 0·019, 0·03, and 0·03 radians respectively. As far as coaches and railcars are concerned, values of β not exceeding about 0·02 should be the aim, while values of up to 0·032 encountered with some vehicles in current production must be regarded as excessive.

ROLL STIFFNESS OF COACH, RAILCAR AND LOCOMOTIVE BOGIE SUSPENSIONS AND THE ANGLE OF ROLL (FOR ONE BOGIE)

No.	l_1 (ft. in.)	c_a [t.ft/rad.]	l_2 (ft. in.)	c_b [t.ft./rad.]	c_t [t.ft./rad.]	W [t]	β 1/1000[rad.]
Coaches and Railcars							
1	6 5½	840	6 5½	391	266	29·5	20
2	6 6½	840	6 6½	382	262	26·9	27
3	6 6½	1,190	5 2⅝	258	228	27·7	19·5
4	6 5½	800	5 0½	264	199	29·8	27
5	6 2¾	498	6 2¾	373	213	24·3	25
6	6 2¾	498	6 2¾	547	262	24.3	20
7	6 5	910	4 8½	1,745	147	22·7	24
8	6 5	800	5 1½	243	186	29·8	27
9	6 6¼	1,175	4 11	390	300	35·5	30
*10	6 6	1,070	5 7/3 11	455	325	22·7	29
*11	6 6	1,600	5 2¼/4 10½	610	442	21	20
12	6 6	1,270	4 3½	450	332	22	20
13	6 6	1,700	6 7	1,160	686	22	13
14	6 6	1,000	4 6	502	336	16·5	13
15	6 6	1,000	4 6	300	232	16·5	21
16	6 4¾	1,190	5 5	1,075	562	20	17
Diesel and Electric Locomotives							
17	6 9½	4,200	5 3	1,140	880	38	13
18	6 4	4,500	4 6	1,400	860	40	23
19	6 3½	5,100	7 5¾	2,070	1,470	45·5	19
20	6 4½	6,100	7 0	2,050	1,570	45·5	18·5
21	6 5	6,200	4 5½	1,300	1,080	67	38
22	6 5	3,425	4 10½	1,200	1,130	64	28
23	6 7	3,400	6 11	1,480	875	40	21
24	6 6	3,225	6 6	1,650	1,100	52	20
25	6 8½	2,400	4 8½	2,570	1,250	42	16
26	6 4⅜	3,200	4 8½	1,770	1,140	45	28
27	6 3	3,400	4 3	1,220	900	45	25

* Refer to double-bolster bogies.

Use of Torsion Bars

If closeness of springs or other considerations prevent the direct attainment of the necessary anti-roll characteristics, then alleviation can be also achieved by the use of torsion bars suitably coupled to the bolster (4). It is essential to consider the design in terms of pitching, bouncing, lateral displacement and nosing, roll, and swaying (5).

Steam locomotives having a centre of gravity usually located halfway between cylinder and boiler axes or given as $h=0{\cdot}6\ (H_b-D)$ or $h=0{\cdot}45H_b-0{\cdot}3D$ where H_b and D is the height of the boiler axis above rail level and wheel diameter, respectively, can show values of β varying between 0·01 and 0·07 radians (6). The maximum speed through curves was here limited to $V=4\sqrt{R}$, where V[km.p.h.] is the speed and R[m] the curve radius, the equivalent unbalanced lateral force being equivalent to about 0·05g.

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(To be continued)

EXHIBITION OF NIFE PORTABLE LAMPS.—A private exhibition of Nife portable safety lamps will be held in the Clyde Reception Room of More's Hotel, India Street, Glasgow, C2, from October 31 to November 3. Admission is free, and the exhibition will be open from 10 a.m. to 6 p.m. A range of portable industrial lamps manufactured by Nife Batteries of Redditch, Worcs., will be displayed. These include industrial inspection lamps, floodlight sets, high-power searchlights, and charging equipments. Tickets can be obtained from Nife Batteries, Union Street, Redditch, Worcs. Tel.: Redditch 2355.

PASSENGER SERVICES WITHDRAWN FROM LISBURN-ANTRIM BRANCH.—Passenger services were withdrawn by the Ulster Transport Authority on September 12 from the branch of the former Great Northern Railway of Ireland from Lisburn to Antrim. A bus service is in operation. The line remains open for goods traffic as a link between the G.N.R. (I.) Belfast-Dublin main-line and that of the former Belfast & Northern Counties (later Midland and subsequently London Midland & Scottish (Northern Counties Committee)) Railways between Belfast, Antrim, Coleraine and Londonderry. There is no other convenient physical connection.

LAKE DISTRICT BRANCH LINE SERVICE TO BE CONTINUED.—After a review of passenger and freight traffic British Railways has decided that the summer passenger service is to be retained on the Ulverston-Lakeside branch line. Freight trains to Greenodd, Haverthwaite, and Lakeside will continue to run throughout the year.

RAVENGLASS & ESKDALE RAILWAY PURCHASER.—The 1-ft. 3-in. gauge Ravenglass & Eskdale Railway in Cumberland was sold by auction at Gosforth on September 6 for £12,000. It has been bought by the recently formed Ravenglass & Eskdale Railway Preservation Society.

PAKISTAN RAILWAYS INAUGURATE COMPOSITE RAILCAR.—A railcar with upper-cum-third class accommodation is now in use between Lahore and Rawalpindi, on the North Western Railway. It is called "Subak Raftar," a name which implies speed.

FITTER DISSATISFIED WITH INADEQUATE EMPLOYMENT.—A fitter at British Railways Derby Carriage & Wagon Works left his employment because he felt that the work he was required to do was insufficient to justify his wage. He stated that he had received £245 in wages, but estimated that only £30 of this was actually earned. He said that many other employees spent their working day in public houses. It is stated by British Railways that there is no shortage of work at the Carriage & Wagon Works, but that there is a need for more skilled men.

Skew Bridge Widening Over Main Line

Arch near Cullompton, Western Region, widened by 15 ft. : mass-concrete curved slab cast in situ

Completed bridge from Cullompton side, showing mass-concrete arch

ABOUT 15 miles north-east of Exeter the main road from Taunton to that city crosses over the West of England main line of the Western Region, British Railways, on a fly-arch at about 36-deg. skew. The road, A.38, not only carries heavy traffic but hitherto has narrowed to a dangerous bottle-neck at this bridge with a width of only 18 ft. between parapets and no footpath on a sharply falling gradient. Known as Stoneshall Bridge, it was a brick structure about a mile north of Cullompton Station; the railway is double-line running approximately north and south at that point.

It was decided in 1958 that this bridge must be widened for road traffic by an average of 15 ft. southwards from the existing bridge, to provide a minimum road width of 24 ft. and a pavement; work began in February, 1959, and was completed in July of that year.

Mass-concrete Arch Extension

The widening was carried out in the form of *in situ* cast mass-concrete curved slab arching corresponding in soffit to that of the original arch, and varying in depth from about 7 ft. at springing to 2 ft. 2 in. at the crown. The new spandrel wall was built in brickwork with a precast concrete string course and coping, and to match it the old northern parapet was rebuilt to the same design.

Before excavation for the foundations and temporary supports for the false-work could be put in hand, parts of two brick aprons, one on each side of the line, had to be dismantled.

The centering for casting the new arching was in three parts, one centrally over the tracks, and the other two one on each flank to carry the haunches of the new arch concreting. The central part consisted of ten 8-in. x 5-in. rolled-steel joists rolled in a curve corresponding to the soffit of the old arch.

They were supported at each end and centrally by military-type steel trestle bents, the middle one being between the up and down tracks.

As it was impossible to avoid infringement of standard running dimensions in siting these trestles, a speed restriction of 10 m.p.h. had to be imposed on traffic in both directions for a period of three months while the centering was in use. The flanking centering consisted of tubular scaffolding carrying 9-in., 3-in., longitudinal timbers. The joists are secured to the longitudinals by Lindaptor clips.

For the arch-slab voussoirs some 150 cu. yd. of Class "D" rapid-hardening concrete was placed from hand-barrows wheeled along a cat-walk across the cutting from the mixing plant. The cat-walk was carried on tubular scaffolding erected alongside the outer face of the new arch; and 5-ft. lengths of 85-lb. rail were cast into the foundations and adjacent voussoirs as shear bars.

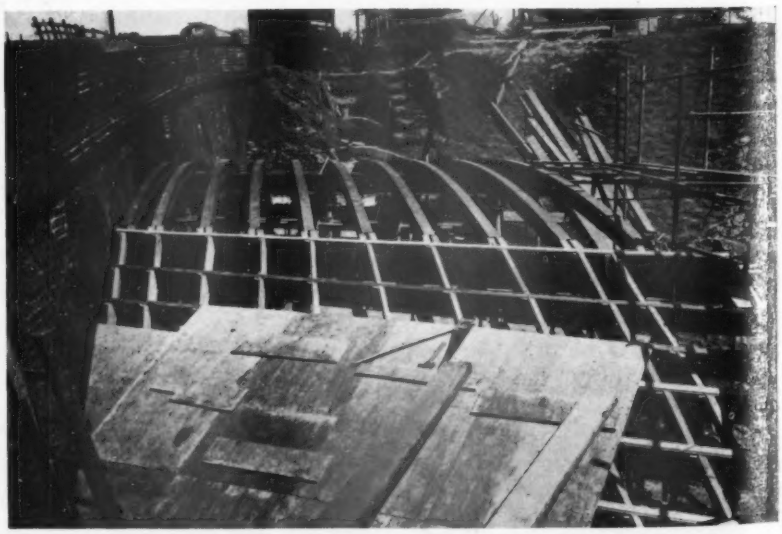
Erection and Dismantling of Shuttering

The only difficulty encountered was in the erection of the shuttering. It was laid down in the specifications that the construction joints between voussoirs should be at 90 deg. to the new face-line across the width of the arch. Consequently there was a wind in the battered surfaces of each unit resulting from the 36-deg. skew of the bridge.

Key projection moreover had to be formed centrally about the depth of each voussoir. Some little initial delay occurred because of these conditions but was soon made up for as work progressed towards the crown where the effect of the wind was reduced, overall progress was thus maintained as planned.

Dismantling of the centering was facilitated by the fitting of a pair of hardwood wedges bolted together to form a block on the head of each trestle column. Their removal enabled the joists to be lowered and the shuttering to be withdrawn, and made it possible to carry out the whole of this part of the work during occupations between trains.

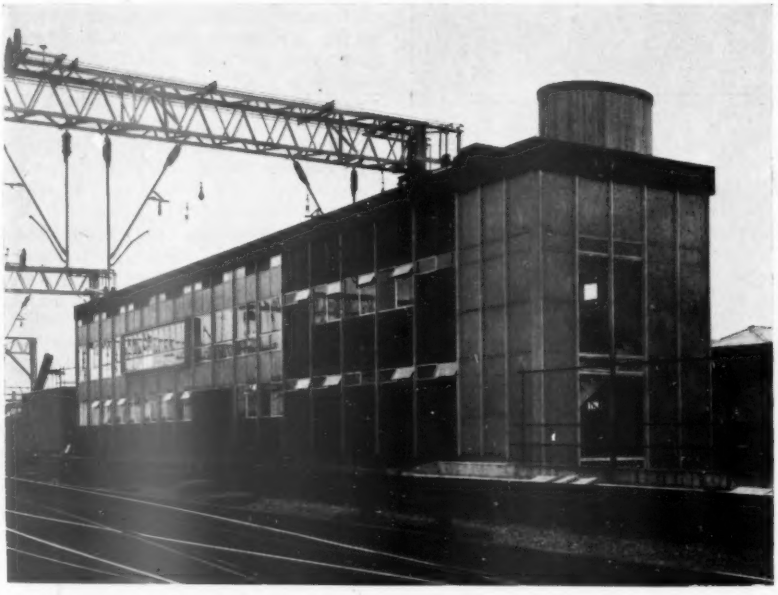
Waterproofing over the arch was effected by bonding three layers of bituminous felt to the extrados with hot bitumen, before a 2-in. screed was laid prior to back-filling up to string-course level. Thereafter only the demolition of the old southern parapet and surfacing of the roadway by the highway authority remained to complete the work.



Shuttering to up side soffit, showing stepped foundations to spandrel wall (top centre) and partly erected cat-walk (right)

New Signalling at Manchester London Road, L.M. Region

Increased flexibility of working and line capacity from applications of newly-developed equipment



General view of signalbox, showing support of overhead electrification structures

ELECTRIFICATION of the British Railways, London Midland Region, line from Crewe to Manchester on the 25-kV., 50 cycles, single-phase A.C. overhead traction system, has been accompanied by the complete rebuilding of Manchester London Road Station. There are now 14 platforms, including those serving the Manchester South Junction & Altrincham through line. All the platforms have been considerably lengthened. In the old London Road Station the longest platform was only 240 yd. and the shortest 170 yd. After reconstruction, 11 of the new platforms are longer than the previous longest and of these three, namely, the new Nos. 5, 8 and 9 Platforms, are 400 yd. long, and capable of holding a train of 16 coaches with an engine at each end. The whole layout of the lines immediately approaching the station has been completely remodelled. The new layout provides ample scope for "parallel" movements, thereby greatly increasing flexibility of working.

Completion of Signalling Scheme

All these reasons combined to make a new signalling scheme essential, even if it had not become so before. The new scheme is the culmination of the scheme from Crewe to Heald Green on the Styal line and Handforth Sidings on the Stockport line. This latter scheme is operated from two new panel signalboxes at Sandbach and Wilmslow, and was described in *The Railway Gazette* of September 18, 1959.

The London Road signalling is concentrated in one new box, situated just outside London Road Station on the down side. On the former London Midland & Scottish (at a still earlier date, London & North Western) Railway side, its territory extends through Ardwick and Longsight to Slade Lane Junction, where the Stockport and Styal lines diverge. From there, on the Styal line, it extends to beyond Gatley, where it links up with the territory controlled by Wilmslow and referred to above. On the Stockport side it extends to Heaton Chapel, where it connects with the territory controlled by Heaton Norris signalbox. This, of course, leaves a gap from Heaton Chapel right through Stockport to Handforth Sidings. A scheme is under consideration embracing a single new signalbox for the Stockport area, except for Heaton Norris, where a new box was installed only a few years ago.

Junctions in Area

The territory now controlled from London Road is both extensive and extremely complicated. Proceeding outwards from London Road Station, on the right there are converging junctions first with the M.S.J. & A. line from Oxford Road and beyond, and next with lines from Mayfield Station. During the rebuilding of London Road Station, Mayfield became a supplementary passenger station, but it is to be converted into a parcels depot.

On the left there enter converging lines from the London Road goods depot. From there on to Ardwick there are on the left the up and down East lines serving the former London & North Eastern (previously Great Central) Railway line to Guide Bridge and Sheffield; these diverge at Ardwick, where there also diverges the branch to Midland Junction and Phillips Park. On the right, there are the up and down fast, and up and down slow lines. These proceed through Ardwick to Longsight, Slade Lane Junction, and beyond. At Longsight there are carriage sheds, the motive power depot, the electric depot, and goods yards, all with connections to and from the main line. At Slade Lane the Styal line diverges, with connections to and from both fast and slow lines; and the fast and slow lines are re-arranged, so that from then onwards the two fast lines are in the middle with the slow lines outside.

Beyond Slade Lane Junction on the Styal line there are ground frames at East Didsbury and Mauldeth Road Stations, and on the Stockport line there are ground frames at Crossley's Siding and Levenshulme. These are all subject to releases from London Road.

Abolition of Eleven Boxes

The whole of the London Road territory was formerly controlled by 13 signalboxes, with a total of 848 levers. Eleven of these boxes have now been abolished, and the remaining two, Longsight No 1 and Ardwick No. 1, reduced in size and status to electrically controlled shunting frames. Longsight No. 1 box controls shunting movements in the sidings, and slots the main-line signals giving access to them; but London Road controls the main lines.

Ardwick No. 1 box on the East lines controls the former L.N.E.R. goods lines and sidings. The passenger lines now come under London Road. Once again, Ardwick No. 1 slots certain London Road Signals, and also requires certain releases from London Road.

Normally trains to and from the former L.N.E.R. lines (Guide Bridge and Sheffield) are to use platforms 1 to 4 at London Road. The remaining platforms, 5 to 14, will be used by trains from the Stockport and Styal lines, platforms 13 and 14 being the through platforms on the M.S.J. & A. lines; but between London Road and Ardwick, and again at Longsight and Slade Lane, ample facilities are provided, in both directions, for crossing trains from one line to another. Flexibility is the keynote of the new layout.

Signal Aspects

Signals conform to modern standard practice. Most running signals are four-aspect, the main exception being that running signals which lead solely into a terminal platform show red and green aspects only, and not yellow or double yellow. One exception is that the platform starting signals are three-aspect, as the double-yellow is not required for trains starting from a stand. Except in the immediate vicinity of the station, divergent routes are shown almost always by junction indicators,

Operating room, showing track diagram, switch panel and traffic regulator's desk

but running signals leading into the various platforms have route indicators of the " theatre " type. Running signals are of multi-lens, with deflecting inserts in the lenses to give the " close-up " indications.

Most running signals have subsidiary signals beneath them. When " on," these show nothing, but when " off," they show two white lights at an angle of 45° below the red-aspect of the main signal. When they can give access to sidings, they have their own " stencil " route indicators showing routes to the sidings alone. For movements down the running lines, the main route indicators are used.

Shunt Signals

Position-light shunt signals, separated from running signals, show a red and white light horizontally when " on " and two white lights at an angle of 45 deg. when " off." Some of them are fitted with stencil route indicators.

Many signals, especially those giving access to goods lines and platforms, are also equipped with calling-on indications, to lead into occupied roads. When " on," no indication is given. When " off," the subsidiary signal with its appropriate route indicator is cleared, and also the calling-on signal shows the illuminated letter " C."

The approach to a terminal platform is governed by the practice first introduced at Liverpool Lime Street Station. Each platform road is divided into an inner and outer track circuit. If the road is clear to the buffer-stops, the running signal comes " off." If the inner track circuit is occupied and the outer track circuit clear, the calling-on indication can be given as soon as the train enters the short berth track circuit immediately behind the platform home signal. If the outer platform track circuit is occupied, then the calling-on indication cannot be given unless the home signal berth track circuit is occupied and the track circuit immediately behind the berth track circuit has been cleared.

This is to ensure that no train is signalled into a platform, unless there is room for it. In effect, the length of each train is measured before it can be signalled into an occupied platform. If the outer platform track circuit is occupied, then only a short train or light engine can be signalled forward.

Restricted Aspects

In all appropriate cases, restricted aspects are used. In other words, the signal will not clear until the train has entered the approach track circuit. All signals except ground shunt signals are restored to the " on position " as soon as the train occupies the track circuit immediately ahead of them, or in the case of platform starting signals, the berth track circuit clears, whichever is the sooner (further reference to this is made later). Approach locking, with the attendant time-releases, conforms to modern practice, and at Slade Lane, where relatively high speeds are still customary, the approach locking is carried back to beyond the outer distant (double yellow).

Overlap Keys

An innovation at London Road is the provision of " overlap keys " for certain signals and the routes immediately ahead of them. Their object is to add to the speed and flexibility of working.

Take, as an example, the home signal giving access to a group of platforms. Immediately beyond that signal and within the limits of its overlap, the line diverges into two or three separate routes, and each of these routes of course has its own overlap point. Beyond the overlap and before a particular platform is reached there will usually be further divergences. And over the whole area from the signal to the platform there are conflicting lines, crossing and converging.

Normally, if a conflicting movement prevents the road being set and the home signal cleared for the desired platform the train would have to be held at the signal in rear of the platform home signal. But it may well be that while the road is not clear to the overlap in the desired direction it is clear as far as another overlap.

If the road is clear and set up as far as any overlap, the train can be signalled forward to the platform home signal. If, while it is proceeding towards this home signal, its road clears as far as its desired overlap, though not as far as to its platform, then the signalman turns the appropriate overlap key. This sets the road as far as the desired overlap of the train.

The result is that it immediately becomes possible to make a second move, which hitherto had been impossible because of the holding of the road as far as the first (unwanted) overlap. Equally, it means that the train immediately concerned need no longer be held at the signal in rear of the home signal. It only remains to add that if while the train is proceeding toward the home signal its road becomes clear right into its platform, the overlap key is not used. Instead the home signal, running or calling-on, is cleared in the normal way.

Site Restrictions

Site restrictions over the greater part of the area necessitated the provision of many signal gantries and brackets specially designed to allow for the position of the traction wiring and the over-riding need for the best possible approach sight of all colour-light running signals. Weldmesh guards are fitted to all signal structures for the protection of maintenance staff, necessitated by the close proximity of the traction wiring.

The approach to London Road Station lies along a viaduct, and it was hard to find a site for the new signalbox. In the end the box was placed on the site of former sidings on the down side. Fortunately these sidings included a turntable, and to accommodate this turntable a shelf had been built projecting over the public highway alongside the viaduct.

This shelf was needed for the new box, and as it was already in existence it could be used without having first to obtain Parliamentary powers, which might have caused considerable delay.

Beneath the new box there are arches, originally used as stables and later as garages. Here the floor was sunk, and dummy walls and ceilings built. In them are now located the power equipment and relay room.

The box itself consists of two storeys. At rail level there is ample staff accommodation. The operating room is on the upper floor, from which there is a good view of the adjacent lines, though the greater part of the area controlled is out of sight of the signalmen.

The total staff consists of a regulator and three signalmen on each 8-hr. shift. They control 96 colour-light signals, 71 position-light signals, and 192 electro-pneumatically operated points. There are 244 track-circuits.

The operating room is equipped with

an illuminated track diagram, a switch panel, and a traffic regulator's desk. The diagram and the panel are arranged around a shallow arc embodying two obtuse angles.

This means that both diagram and panel are in three sections. The two left-hand sections, controlled by two signalmen, are continuous and these sections of the diagram show the whole territory. They control the former L.M.S.R. lines from Styal and Stockport. The right-hand section, controlled by the third signalman, relates to the former L.N.E.R. line from Guide Bridge and Sheffield, whose trains normally run into and out of platforms 1 to 4.

In this case the diagram is a duplicate of the relevant parts of the main diagram. Again certain signals are given duplicate numbers. These are signals embracing routes common to both the larger and smaller section, and each has duplicate switches, one on the larger and the other on the smaller section of the panel.

Track Diagram

The diagram shows the tracks in white on an olive-green matt background. It gives three sets of indications. First, when a route is set up, the points detected and proved home, a row of white lights known as "route lights" shows along the whole length of the section concerned. They remain until the train has passed through, and the approach and route-locking released behind it, section by section, or, if the train does not proceed, until the relevant time-releases have taken effect. Thus the signalman knows not only that the route has been properly set up, but also when he can initiate another movement over the same track. Next, the occupation of each track-circuit is indicated on the diagram by two red lights. A new feature is that the description of all trains is shown on the diagram itself, instead of on separate screens.

Opposite each running signal beyond the immediate vicinity of the terminal platforms there is on the diagram a small screen on which a four-figure number can be projected. The first figure gives the description of the train, e.g., "one" for an express and "two" for an ordinary passenger train. The second figure gives the destination of the train, and the last two figures identify the train.

As each train moves forward, its description moves forward also, the whole process being automatic. On the line from Crewe *via* Styal, the signalman at Crewe North Junction sets up the description. It is then transmitted automatically from signal to signal and displayed at each signal on Sandbach, Wilmslow and London Road illuminated diagrams, as the train proceeds. For example, on the London Road diagram, as a train occupies both the berth track-circuit and the succeeding track circuit at any signal, its description automatically moves forward to the screen opposite the following signal; and so with outgoing trains, when the London Road signalman initiates the description. To do so, he first presses the appropriate buttons on his switch panel numbered from 0 to 9, to set up the correct four-figure group, and then presses the "transmit" button. He has in front of him on the panel a stencil showing the four-figure number of the "last train sent," also a cancelling button in case of need.

Any signalman from London Road to Crewe can interpose a train in case of need. He can also hold a train on a loop to let a following train through. All this is taken care of automatically so far as the indications on the diagram are concerned.

For trains reaching London Road from Stockport their description is initiated from Heaton Norris. Trains from Guide Bridge and Sheffield are described by Ashbury's West, the first box outside the London Road territory.

Switch Panel

The switch panel consists of a sloping console or shelf, with behind it an upright panel. This upright panel embodies the signalman's telephone to drivers standing at signals; the transmitting end of the train describers; the overlap keys mentioned above; control switches governing outlying ground frames; and the emergency point switches.

As soon as a driver picks up a telephone and operates the switch at any signal a buzzer sounds in the signalbox and the signal number comes up on a stencil in front of the signalman. The telephone is close beside the stencil, and so the signalman can immediately give the driver any necessary information or instructions.

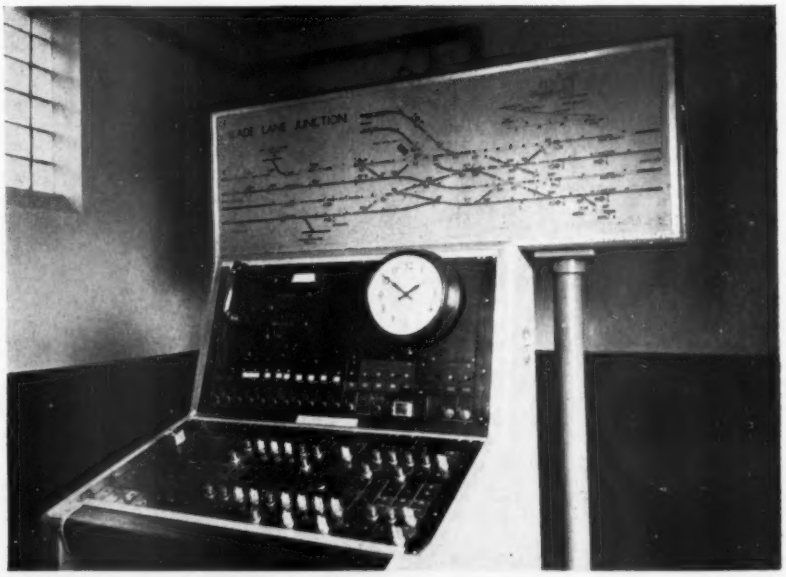
The emergency point switches have three positions, "normal," "central," and "reverse." They are usually in the central position, and then the points are operated by the route-setting signal switches on the console. In case of need, however, the signalman can use these switches to operate each set of points separately. They have three indication lights, normal, non-correspondence, and reverse. The non-correspondence light is a flashing light, and tells the signalman that the points are not detected home in the position corresponding to that of the switch.

The console contains the route-setting signal switches. A single switch sets up the route, and when all the points, including those needed to "give protection," are home and detected, the signal comes off (unless, of course, it is "approach controlled"). Where a running signal has a subsidiary signal below it, or where it gives access to a choice of routes, the number of that signal relates to a group of switches. The switches are coloured red for running signals, and white for subsidiaries. Above each group there is a single "repeater," showing red for "on" and green for "off"—the latter, whatever the "off" aspect shown by the signal.

Many running signal switches, especially those relating to outlying signals, are three-position switches—"on," "stick," and "auto." Each signal is replaced to red as soon as the train passes it. If the switch was in the "stick" position, then it has to be replaced to "on" and turned off again before the signal will clear a second time. But if it is the "auto" position then the signal will clear again automatically, as soon as the train has cleared the track circuits ahead, including the prescribed overlap. The signalman chooses between "stick" and "auto," according to the general state of traffic. Subsidiary signal switches have no "auto" position.

Regulator's Desk

The regulator's desk is situated in the centre of the arc, and well away from it. The regulator can see the whole of the diagram without difficulty. On his desk there are telephone keyboards from which circuits radiate to stations and other signal boxes in the area; to traffic and electric traction control rooms at



Emergency panel at Slade Lane

Manchester and Crewe; and to the railway telephone exchange.

Telephones are provided at all running signals to enable trainmen to speak to the signalman if detained at a signal and also in cases of emergency. Maintenance telephones are provided to link up lineside locations, relay rooms and other vital points with the signalboxes. A number of lineside telephones are also provided for the use of the Electrical Engineer, and are connected to the electric traction control room at Crewe. Telephone equipment of a new design has been provided to enable the Traffic Controller at Manchester London Road to dial and call selectively the stations, signalboxes and so on, on the electrified line.

A staff location control panel is also mounted on the regulator's desk. This enables maintenance personnel to be called to the telephone by transmitting distinctive notes over the trackside loudspeaker system.

Power Equipment

The power equipment is, as already explained, situated at (or rather just below) street level in the arches of the viaduct. Power is taken from the local authority at 415-V., 50 cycles. It is transformed to 110 V. for local distribution and up to 650V. for distribution to the outlying satellite relay interlockings. A 200-kVA. diesel-driven three-phase alternator is available as a permanent standby in the power equipment room with the associated automatic contactor change-over gear, by which the full load can be taken over in about 8 sec. in the event of the failure of the normal supply or a drop of more than 10 per cent, in voltage, or 2 per cent in frequency. The change back to the normal supply, however, is not automatic. It is carried out by the attendant in charge, the object being to ensure correct phasing.

For the operation of the electro-pneumatic point machines, the power equipment room also contains duplicate electric compressors and a diesel-driven standby compressor. Air to the points is led through plastic pipes. These have several advantages over the more usual iron pipes. They are immune from stray electric currents, and are not liable to condensation troubles. No difficulty has been experienced over their jointing.

Duplicate Frequency Convertors

The room also contains duplicate frequency convertors. Each such convertor comprises a six-pole synchronous induction type motor directly coupled to two separate 10-pole alternators mounted on a common bed-plate. One alternator provides the 650-V. 83⅓-cycle supply for the local distribution and the other a 110-V. 83⅓-cycle supply for the relay local coils. Similar but smaller frequency convertors are provided in duplicate at Ardwick Junction, Longsight North, Longsight South, and Oxford Road. These frequency convertors are part of the immunisation scheme necessitated by two different types of electric traction current in use in the London Road, Longsight, and Oxford Road areas.

Over the greater part of the area controlled from the new London Road box the main signalling and telecommunications cables are laid in concrete troughing parallel with the track and at ground level. For signalling purposes multi-core signalling cables are of the 1/036 in. composite vulcanised rubber/polychloroprene (VR/PCP) insulated type with a heavy duty polychloroprene (PCP) sheath. For direct-wire remote-control circuits a 200-pair telephone type cable is used, which has 20 lb. per mile, 0·0355-in. tinned copper conductors with polythene insulation 0·012 in radial thickness, a polythene inner sheath and outer sheath of PVC.

The telecommunications cables are of two main types: one is 54-pair star quad trunk type paper insulated air spaced audio cable with 40-lb. conductors within an aluminium sheath lapped with two polyvinyl chloride (PVC) and one compounded cotton tapes, surrounded by two or four steel armour tapes each 40 mm. thick. The outer protective covering over the armour consists of two PVC tapes, two rubber tapes, one PVC and one hessian tape overall with graphite finish.

The other type is a 14-pair low-loss carrier quad paper insulated cable with 36-lb. conductors. The sheath, armouring, and outer covering are similar to that for the audio cable, two steel tapes being provided.

The sheaths and armour tapes are bonded and earthed at 1,000-yd. intervals for screening purposes and in addition they are bonded to protective earths at the lineside location cupboards.

Protection from Induction

These telecommunications cables are specially designed to provide magnetic screening against induction from the a.c. traction system and to conform to the C.C.I.T.T. recommendations that induced voltages in the conductors under maximum traction fault conditions and under normal running conditions shall not exceed a potential of 430 V. and 60 V. respectively.

Control and lineside telephone circuits for traffic, isolation, and maintenance purposes, remote control circuits (C.T.C. signalling type) also supervisory traction control circuits are accommodated in the audio cable. The carrier cable is used for the through trunk circuits between Crewe and Manchester.

To make room for lineside apparatus on the viaduct approaches to the station, the parapet has been cut away at intervals and special platforms have been built cantilevered out from the viaduct wall. Groups of steel apparatus cupboards are mounted on these platforms at right-angles to the track and spaced in such a way as to permit of inspection by the line staff clear of the running lines.

The Relay Room at London Road contains all the interlocking, track-repeater, approach-locking, route-locking time release, detection indication and other relays controlling the area up to and including Ardwick Junction. The relays are arranged neatly on racks and the wiring is housed in the vertical supports. All the relays are of the plug-in type, so that any one can be replaced instantly without touching its connections. Each type of relay has its own distinctive plug, thereby making it impossible to plug in a relay of the wrong type. Extensive use is made of the new miniature relays, which have up to twelve contacts. This has permitted of a great saving of space.

Satellite Interlockings

The relay room also contains the "office" apparatus needed in connection with the outlying satellite interlockings. These fall into two groups. The first comprises two satellites, at Longsight North and South, respectively. The second comprises three satellites, at Slade Lane, Mauldeth Road and East Didsbury, respectively. Each of these five interlockings is self-contained so far as safety signalling and interlocking circuits are concerned. They contain in fact all the various relays which have just been mentioned.

They are, however, under remote control from London Road. Their points and signals are operated by the switches on the panel, and the indications appear on the diagram, as with the area controlled through the London Road relay room.

The remote control means that only two links are required. The outgoing link comprises the control circuits whereby the points and signals are operated, provided that conditions at the satellite render this possible. The incoming circuits provide the indications, whether for the diagram or for the repeaters on the panel. The whole object was to bring these areas under the control of the single large signal box at London Road, thereby enhancing speed of operation, flexibility and traffic regulation; and at the same time to avoid incurring excessive costs in multi-core signalling cable.

For the satellite relay interlockings at Longsight North and South direct-wire remote control is employed. With this system separate twisted pairs (20-lb. wire in telephone cable) are used for each indication and control function. Post Office type relays operating at 50 V. are used for the line circuits. These relays have no special safety functions, as all they have to do is to reproduce the conditions at the other end of the circuit.

For the remaining satellites, Slade Lane, Mauldeth Road and East Didsbury, Westronic transistorised high-speed coding equipment of the C.T.C. type is used, similar to that in use at Sandbach and Wilmslow.

Control Code Frequencies

Control or indication codes for each two-position function, *e.g.*, signal "on" signal "off," are transmitted at carrier frequencies. Two different frequencies are used for outgoing control codes, the appropriate frequency being selected for transmission by the position of the corresponding panel switch. Two other frequencies are employed for indications transmitted to the signal box, the frequency selected for transmission being that corresponding to the condition of the external function. All stepping, counting chain actions, and intermediate

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These telecommunications cables are specially designed to provide magnetic screening against induction from the a.c. traction system and to conform to the C.C.I.T.T. recommendations that induced voltages in the conductors under maximum traction fault conditions and under normal running conditions shall not exceed a potential of 430 V. and 60 V. respectively.

Control and lineside telephone circuits for traffic, isolation, and maintenance purposes, remote control circuits (C.T.C. signalling type) also supervisory traction control circuits are accommodated in the audio cable. The carrier cable is used for the through trunk circuits between Crewe and Manchester.

To make room for lineside apparatus on the viaduct approaches to the station, the parapet has been cut away at intervals and special platforms have been built cantilevered out from the viaduct wall. Groups of steel apparatus cupboards are mounted on these platforms at right-angles to the track and spaced in such a way as to permit of inspection by the line staff clear of the running lines.

The Relay Room at London Road contains all the interlocking, track-repeater, approach-locking, route-locking time release, detection indication and other relays controlling the area up to and including Ardwick Junction. The relays are arranged neatly on racks and the wiring is housed in the vertical supports. All the relays are of the plug-in type, so that any one can be replaced instantly without touching its connections. Each type of relay has its own distinctive plug, thereby making it impossible to plug in a relay of the wrong type. Extensive use is made of the new miniature relays, which have up to twelve contacts. This has permitted of a great saving of space.

Satellite Interlockings

The relay room also contains the "office" apparatus needed in connection with the outlying satellite interlockings. These fall into two groups. The first comprises two satellites, at Longsight North and South, respectively. The second comprises three satellites, at Slade Lane, Mauldeth Road and East Didsbury, respectively. Each of these five interlockings is self-contained so far as safety signalling and interlocking circuits are concerned. They contain in fact all the various relays which have just been mentioned.

They are, however, under remote control from London Road. Their points and signals are operated by the switches on the panel, and the indications appear on the diagram, as with the area controlled through the London Road relay room.

The remote control means that only two links are required. The outgoing link comprises the control circuits whereby the points and signals are operated, provided that conditions at the satellite render this possible. The incoming circuits provide the indications, whether for the diagram or for the repeaters on the panel. The whole object was to bring these areas under the control of the single large signal box at London Road, thereby enhancing speed of operation, flexibility and traffic regulation; and at the same time to avoid incurring excessive costs in multi-core signalling cable.

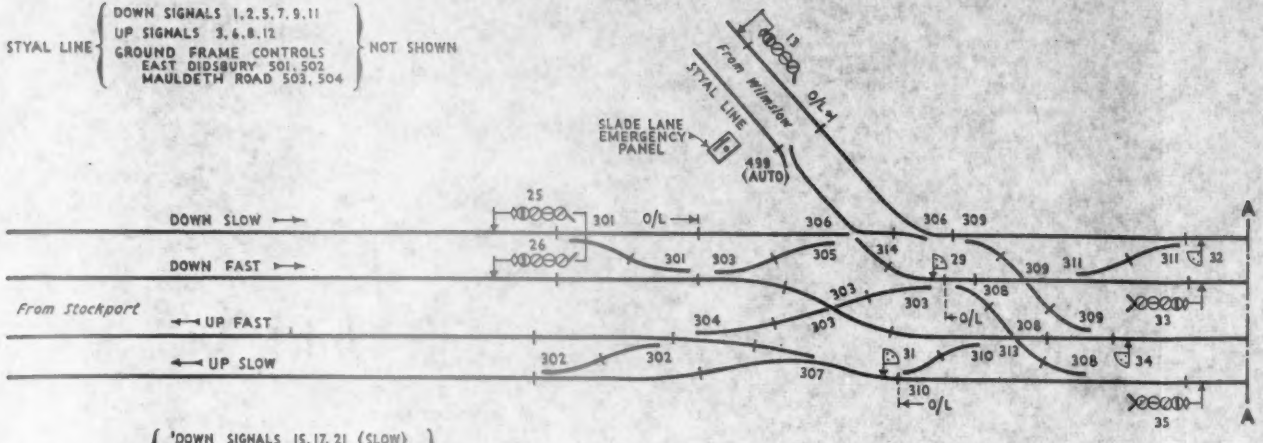
For the satellite relay interlockings at Longsight North and South direct-wire remote control is employed. With this system separate twisted pairs (20-lb. wire in telephone cable) are used for each indication and control function. Post Office type relays operating at 50 V. are used for the line circuits. These relays have no special safety functions, as all they have to do is to reproduce the conditions at the other end of the circuit.

For the remaining satellites, Slade Lane, Mauldeth Road and East Didsbury, Westronic transistorised high-speed coding equipment of the C.T.C. type is used, similar to that in use at Sandbach and Wilmslow.

Control Code Frequencies

Control or indication codes for each two-position function, *e.g.*, signal "on" signal "off," are transmitted at carrier frequencies. Two different frequencies are used for outgoing control codes, the appropriate frequency being selected for transmission by the position of the corresponding panel switch. Two other frequencies are employed for indications transmitted to the signal box, the frequency selected for transmission being that corresponding to the condition of the external function. All stepping, counting chain actions, and intermediate

STYAL LINE { DOWN SIGNALS 1, 2, 5, 7, 9, 11 / UP SIGNALS 3, 6, 8, 12 / GROUND FRAME CONTROLS EAST DIDSBURY 501, 502 MAULDETH ROAD 503, 504 } NOT SHOWN

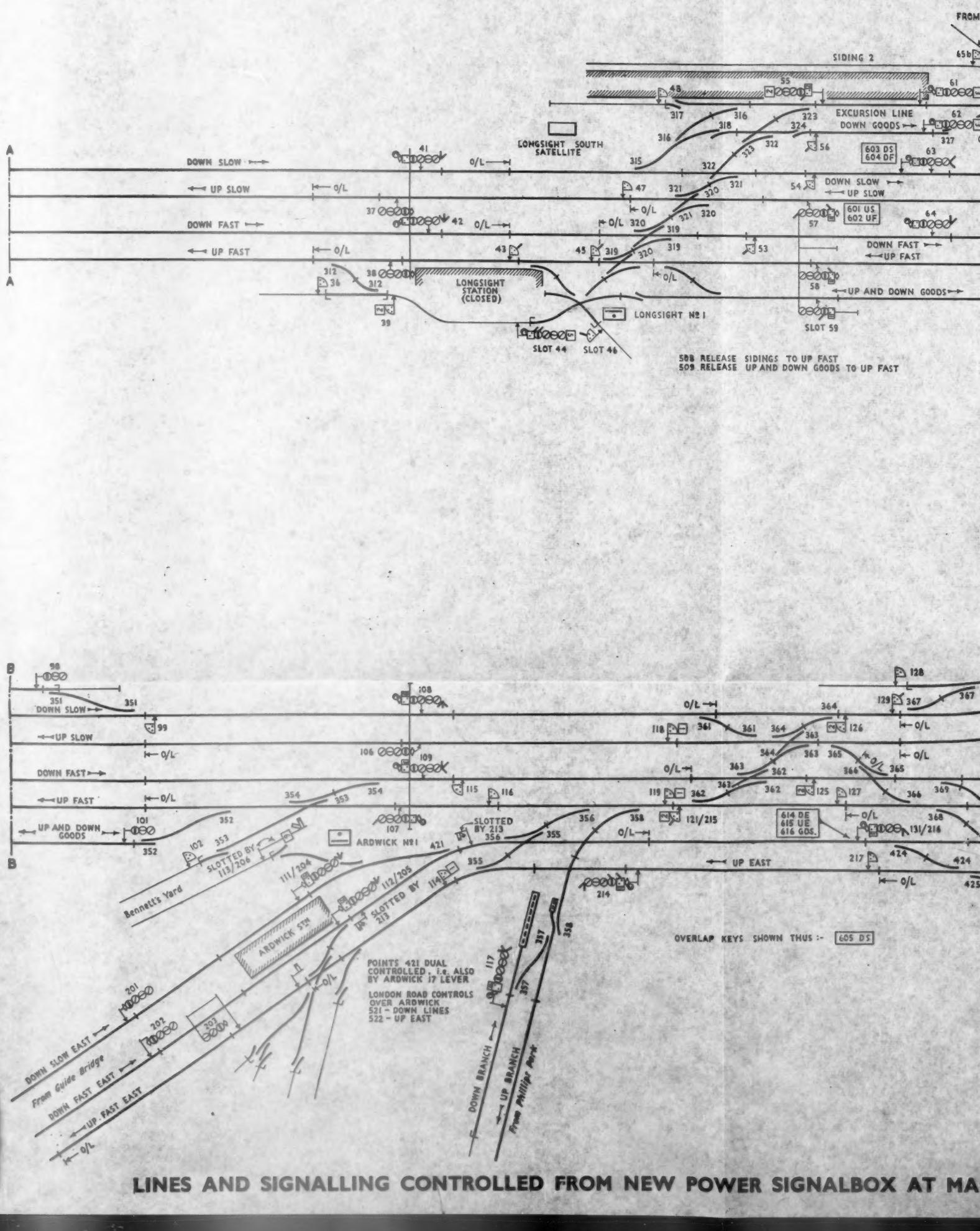


SIGNAL WITH JUNCTION INDICATOR AND SUBSIDIARY SIGNAL AND CALLING-ON SIG

NOTE :- SUBSIDIARY SI
(a) WHEN UNDER
ON
OFF
(b) BY THEMSELVE
ON
OFF
CALLING - ON SIGN

STOCKPORT LINE { 'DOWN SIGNALS 15, 17, 21 (SLOW) 16, 18, 22 (FAST) / UP SIGNALS 23 (FAST) 24 (SLOW) / LEVENSHULME GROUND FRAME CONTROL 506 } NOT SHOWN

SLADE LANE JUNCTION



508 RELEASE SIDINGS TO UP FAST
509 RELEASE UP AND DOWN GOODS TO UP FAST

OVERLAP KEYS SHOWN THUS :- 605 DS

LINES AND SIGNALLING CONTROLLED FROM NEW POWER SIGNALBOX AT MA

TYPICAL SIGNALS

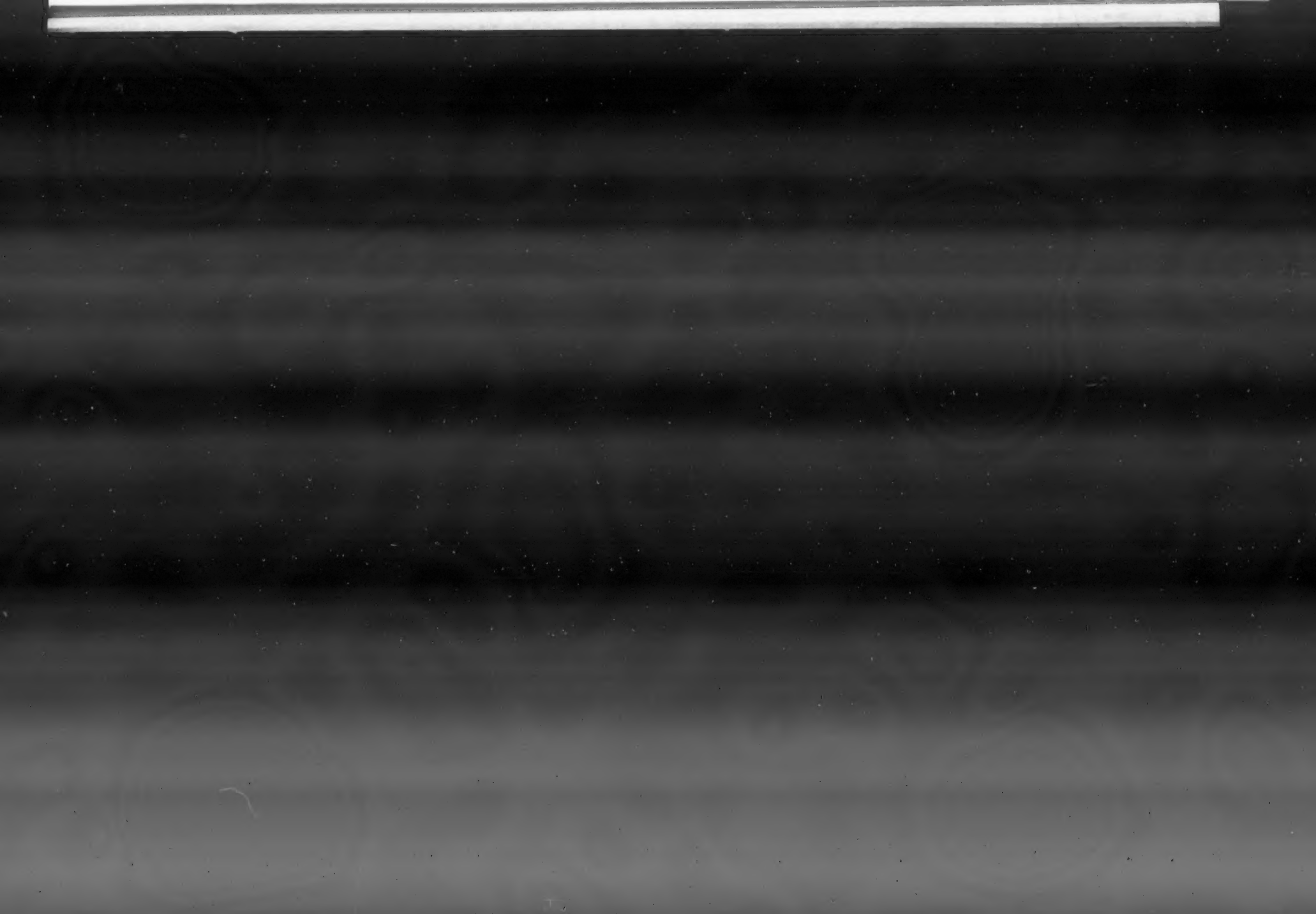
RY SIGNALS
DER RUNNING SIGNALS:-
NO LIGHT
2-WHITE LIGHTS AT 45°
SELVES:-
1-RED 1-WHITE LIGHT HORIZONTALLY
2-WHITE LIGHTS AT 45°
SIGNALS SHOW ILLUMINATED LETTER "C"

FROM SIDINGS 3-14

512 RELEASE SIDINGS TO DOWN GOODS
513 RELEASE EXCURSION LINE TO DOWN GOODS
514 RELEASE DOWN GOODS TO DOWN GOODS

LONGSIGHT No 3
LONGSIGHT NORTH SATELLITE
DOWN GOODS
DOWN SLOW
UP SLOW
DOWN FAST
UP FAST
UP AND DOWN GOODS
O/L FROM SIDINGS
SLOT 73
FROM CARRIAGE SHED
FROM MOTIVE POWER DEPOT
To Mayfield Station
608 US 609 P9 610 P3-8
605 DS 606 US 607 P9
611 P9-14 612 DF 613 UF
617 P3/4 618 P1-3
DOWN SLOW
UP SLOW
MIDLAND
ENGINE SIDING
DOWN FAST
UP FAST
DOWN EAST
EAST ENGINE SIDING
UP EAST
DOWN GOODS
UP GOODS
UP AND DOWN GOODS
(MANCHESTER PICCADILLY)
LONDON ROAD SIGNALBOX
PLATFORM No 12
PLAT. No 11
PLAT. No 10
PLAT. No 9
PLAT. No 8
PLAT. No 7
PLAT. No 6
PLAT. No 5
PLAT. No 4
PLAT. No 3
PLAT. No 2
PLAT. No 1
(SLOT 175)
TO OXFORD ROAD S.B.
To Altrincham
(SLOT 117)
PLAT. No 14
O/L

MANCHESTER LONDON ROAD, BRITISH RAILWAYS, LONDON MIDLAND REGION



registry functions are carried out by transistors. These, with their attendant resistors and capacitors, are embodied in printed circuits mounted on thick cards, one for each code. Up to 50 cards can be housed in a single plug coupled coding unit in such a way that in the event of a fault developing a new card can be plugged in quickly or the complete unit can be changed. With this system relays are only used for the final stick registry and form the only moving parts in the system.

Only one pair of wires is needed for the transmission of up to 50 codes between the signalbox and each satellite and as the speed of operation is of the order of 150 codes per second it means that each two-position function is scanned at least three times a second. This is faster than the signalman's normal reaction time and so for all practical purposes there is complete continuity of indication.

A test panel is provided in the relay room to enable maintenance staff to check spare and defective equipment and identify any faulty component.

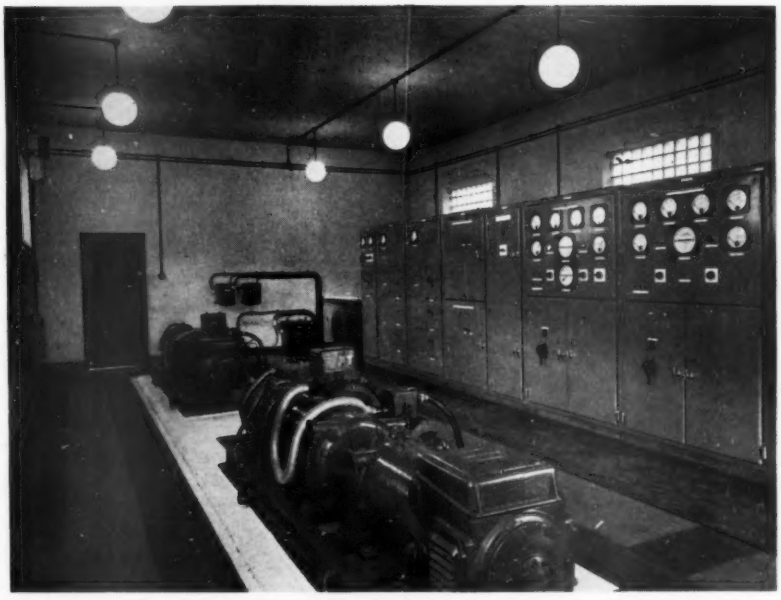
Slade Lane is an important regulating junction. Not only do the Styal and Stockport lines converge here, but the fast and slow lines are re-arranged, with connections between them. No risk can be run here of a paralysis of traffic which could be caused by the breakdown of the remote control link with London Road.

An emergency panel and diagram, therefore, have been installed at Slade Lane. It can be manned in case of need, and controls all the local junction points and signals. The relief-signalman has telephone communication with the London Road regulator, under whose orders he works. To bring the panel into operation, there are release keys both at London Road and Slade Lane. These function over a circuit separate from the normal remote control circuit.

Immunising Track Circuits

The installation between Crewe and London Road of the new electric traction on the 25-kV., 50 cycles, single-phase a.c. overhead system has given rise to the need to immunise track circuits and other signalling and telecommunication circuits from leakage and direct and inductive effects of the traction current. Around London Road Station itself the position is further complicated by the fact that there are two forms of electric traction in the vicinity. The former L.N.E.R. lines from Sheffield and Guide Bridge right into platforms 1-4 at London Road operate on 1,500-V. d.c. overhead traction. The M.S.J. & A. lines running into Oxford Road also operate on 1,500-V.d.c.

So far as Slade Lane and beyond are concerned, the immunisation precautions are similar to those at Sandbach and Wilmslow (see *The Railway Gazette* of September 18, 1959). Relays and point valves are immunised against a.c. up to 1,000 V. All signalling and point detection circuits use 24-V. d.c. immunised relays fed from a completely insulated supply without earth. Where signalling or telecommunication cables cross the running lines they are on their own structures separate from the overhead traction structures, or in ducts below the track.



Frequency converters and switchboard in Longsight power equipment room

Supply for Track Circuits

In the London Road area, where two systems of electric traction operate, a two-phase 83⅓-cycle a.c. supply is used for track circuits and detection circuits between London Road and Longsight. The two-element track and detector relays are grouped at four points within this area (at Longsight North, Longsight South, Ardwick Junction and London Road itself), in the same buildings as the 50/83⅓-cycle frequency convertors which feed these. By this means the possibility of the 83⅓-cycle supply for the relay local coils becoming contaminated with 50 cycles is eliminated.

From Ardwick Station, where the d.c.-equipped lines towards Sheffield diverge, the existing 50-cycle track circuits have been converted to 83⅓ cycles as far as Gorton, about two miles further on. This eliminates any possibility of irregular operation by 50-cycles through leakage from the Crewe 25-kV. traction lines; 83⅓ cycle track circuit and detection equipment has also been installed at Oxford Road on the M.S.J. & A. Line. The convertors and relays are housed together in the same building at Oxford Road.

Introduction in Three Stages

The whole of the installation was brought into operation in three stages. In December, 1959, the first stage was completed, when the control of the whole of the Longsight, Slade Lane, Mauldeth Road and East Didsbury area was transferred to the new box at London Road.

The second stage was reached in June, 1960, when the control of the Ardwick Junction and London Road Station areas was transferred to the new box, with the exception of platforms 5 to 10, whose construction was not by then complete. The third and final stage was reached on August 28, 1960. This was in readiness for the inauguration of the new electric services between London Road and Crewe on September 12.

Even by August experience had shown how greatly the new central box, with the new layout, had added to speed and flexibility of operation. The regulator has the whole territory under his eye. A route can be set up and the signal cleared within a matter of seconds after turning the switch, in the remote control areas, as in that of the station itself. Already, it is stated, trains can be worked to narrower margins without causing delay.

Maintenance of Equipment

For the efficient maintenance of the new equipment the maintenance staff is divided into two groups, based on London Road and Longsight respectively. At each centre amenities and workshops are provided. Each lineman on duty has a stock of spare relays and other parts available. He has road motor transport so that he can get quickly to any point where he is needed.

The work was planned and specifications prepared under the direction of Mr. E. G. Brentnall, Signal Engineer, London Midland Region, and has been carried out to his requirements under the immediate supervision of Mr. C. G. Derbyshire, Assistant Signal Engineer (Modernisation).

The principal contractors were as follow:—

Power signalling, including remote control equipment	Westinghouse Brake & Signal Co. Ltd.
Train describer equipment and signal-post telephones	Standard Telephones & Cables Limited
Power equipment and associated switchboards	Pelapone Limited
Telecommunication cables	British Insulated Callender's Cables Limited
Regulator's desk and telephone concentrators	Automatic Telephone & Electric Co. Ltd.

Austrian Main-Line Diesel Locomotive

2,200 *b.h.p. class with* 19/19½*-ton axle-load*

77½-ton 2,200 b.h.p. B-B diesel-hydraulic locomotive, Austrian Federal Railways for general services

THE first of ten large new diesel-hydraulic locomotives is now running on the Austrian Federal Railways, principally on the Southern main line between Mürzzuschlag and St. Veit, and over the north-south line from Graz through Leoben and St. Michael to Selzthal. The normal roster includes both passenger and freight working, and averages 425 miles a day. The next four locomotives of this design are to be built during the winter of 1960-61, and the next five are to follow in 1961-62.

Built by Simmering-Graz-Pauker A.G. at its Floridsdorf works, these new locomotives, of Class 2020 in the Austrian Federal Railways list, are along the lines of the almost universal conception of main-line diesel-hydraulic locomotives of around 2,000 b.h.p.; that is, they are of B-B axle layout, have two reasonably quick-running and lightweight engines each driving its own transmission unit and the two axles of one bogie through cardan shafts, weigh 74 to 80 tons according to whether or not train-heating equipment is installed, and have a driving cab at each end. But in these locomotives, because of Austrian Federal Railways requirements, the top speed is limited to 68 m.p.h.

Mechanical Portion

A conventional welded-steel superstructure, with two deep outer longitudinals as the principal members, is mounted on two bolster bogies having certain unusual features, among which is the low location of the bolster, which passes through the bogie frame structure below the centre transom, and the bogie centre pin, which transmits traction and braking forces, thus goes upwards from the bolster into the bogie; the superstructure weight is carried at the sides, directly on to the laminated side springs of the bolster. The guides of the roller bearing axleboxes are in the form of long arms with silentblocs, and some lateral control of a wheel set is provided by a cross-link system connecting the outer guide arms of the two axleboxes. Each box has its own individual underhung laminated spring.

Power comes from two Simmering model T-12b 12-cylinder V pressure-charged and charge-air-cooled engines, each set to give 1,100 b.h.p. at 1,295 r.p.m. from cylinders 190 mm. bore by 220 mm. stroke. Cooling groups are arranged in the side curves of the roof; and, under thermostatic operation, the cooling fans are driven and their speed controlled by the Behr hydrostatic system. This hydrostatic system is applied also to the brake air compressor, though in this case the drive is taken off the transmission. Between the two engine-transmission groups there is space for a central 1,000-lb. train-heating boiler and its water tank, though such equipment is not actually installed in the first locomotive.

Transmission

Each transmission comprises a Voith (St. Pölten) L.28/III 4 hydraulic drive plus a flanged-on reversing unit; and from this latter the cardan shaft is taken to the adjacent bogie. The hydraulic portion comprises two converters, and of these the first or starting converter has three-stage blading. Because of the higher efficiency obtained with this, and partly because of the comparatively low top speed for a main-line locomotive, it has been possible to get acceptable speed-tractive effort characteristics without the use of alternate-speed gears after the converters.

Without train-heating equipment the service weight with two-thirds supplies is 74 tons, and with train-heating equipment it is 78 tons; but if a 20-ton axle load can be taken, ballast can be added to give a total locomotive weight of up to 80 tons.

Starting tractive effort at 30 per cent adhesion amounts to 48,000 lb. when no train-heating equipment is installed. Continuous rated tractive effort is 37,500 lb. at 11¼ m.p.h. Wheel dia. is 39·4 in., bogie wheelbase 8 ft. 10 in., bogie pivot pitch 36 ft. 0 in., and length over buffer beams 55 ft. 9 in.; total fuel-tank capacity is 615 gal.

B.I.M. National Conference.—The British Institute of Management National Conference, 1960, to be held at Harrogate on October 11–13, will be opened by Sir John Hunt. The closing address will be given by Professor C. Northcote Parkinson. Among the subjects to be discussed are: operational changes in industry; pay differentials; the effects of the Restrictive Trade Practices Act; automation and the older worker; and the efficient use of financial resources. Details may be obtained from the Conference Secretary, British Institute of Management, 80 Fetter Lane, E.C.4.

Fire in Paddington–Bristol Paper Train.—Two vans of the newspaper train from Paddington to Bristol caught fire near Didcot early in the morning of Friday, September 9. The seven sorters, employees of W. H. Smith & Son Limited, were unable to extinguish the fires, and jumped from the vans after pulling the communication cord. Both vans were burnt out.

Miniature Buffets in Newcastle–Leeds Diesel Trains.—The miniature buffet service recently introduced on the Newcastle–Carlisle diesel trains by the North Eastern Region, British Railways, has been extended. The following weekday trains composed of four-car diesel units, built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd., are now equipped with new miniature buffets: 7.20 a.m. Newcastle to York; 10.15 a.m. York to Leeds; 11.35 a.m. and 5.33 p.m. Newcastle to Leeds *via* York; 7.45 and 11.45 a.m. Leeds to Newcastle *via* York and West Hartlepool; and 5 p.m. Leeds to Newcastle *via* York. In one car of each train, the miniature buffet has one attendant to serve a variety of light refreshments and drinks from the standing bar.

Polish Rolling Stock Exports to Russia.—The value of exports of rolling stock from Poland to U.S.S.R. in 1959 was 148 million roubles.

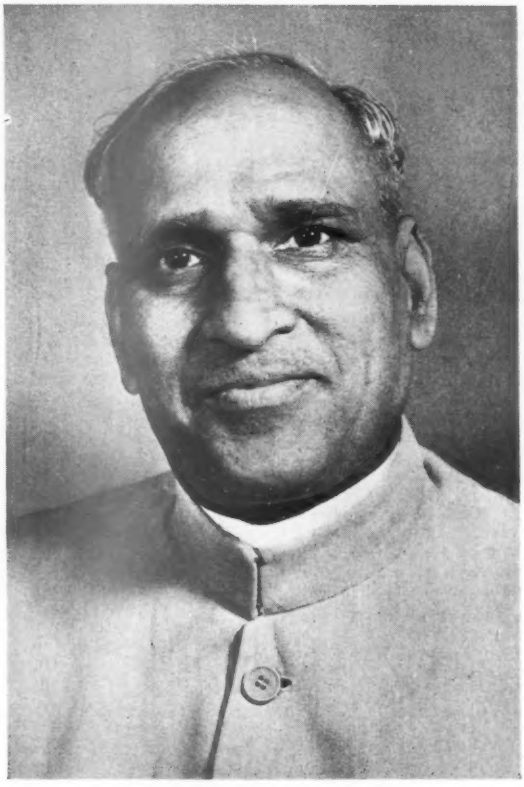
Devonian Express Delayed by Broken Coupling.—The Devonian Express separated in two parts when it was passing through a suburb of Bristol on Friday, September 9. The accident, which is believed to have been caused by the loss of a link-pin, broke the vacuum piping, and the automatic brakes stopped both parts of the train. After a delay of nearly an hour, recoupling was completed to enable the train to proceed.

RAILWAY NEWS SECTION

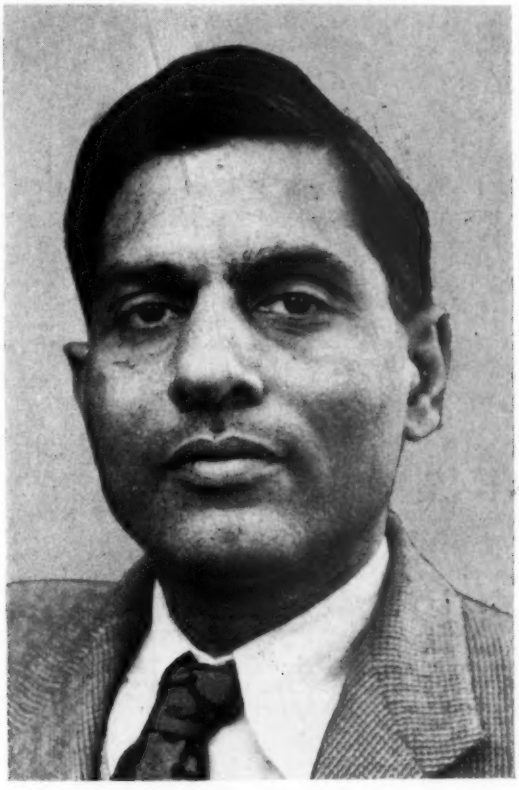
PERSONAL

Mr. Jagjit Singh, Chief Operating Superintendent, Western Railway of India, has been appointed Director Traffic (Transportation), Indian Railway Board.

Mr. S. R. Kalyanaraman, Additional Member (Commercial) Indian Railway Board, who, as recorded in our June 17 issue, has retired, joined the Madras & Southern Mahratta Railway in 1927 as a Traffic Probationer. He passed his Hindustani and qualifying examination for the position of Assistant Traffic Superintendent, and worked at Hubli and Bezwada in that capacity. He held various responsible positions on both traffic and commercial sides, and was appointed Deputy Chief Commercial Manager, and subsequently Deputy General Manager in 1947. In 1949 he became Secretary, Railway Rates Tribunal, Railway Board, Madras, and three years later was promoted to be Chief Commercial Superintendent, Southern Railway. In 1954 he joined the Railway Board as Director, Traffic (General), and became an Additional Member, Commercial, in 1956.



Mr. S. R. Kalyanaraman
Additional Member (Commercial) Indian Railway Board, 1956-60



Mr. R. B. Lal
Appointed an Additional Member (Commercial), Indian Railway Board

Mr. G. P. G. Mackay, the Deputy General Manager of East African Railways & Harbours, has taken over the duties of Acting General Manager & Acting Commissioner for Transport in place of Mr. James Farquharson, the General Manager of East African Railways & Harbours, who, as recorded in our September 9 issue, is on leave in the United Kingdom. He will return to East Africa on October 27.

Mr. E. H. Kinselle, Deputy Head of the Freight Development Section, Traffic Headquarters, York, North Eastern Region, York, has been appointed Head of the Section.

Mr. F. L. Jagger, Assistant (Salaried Staff) to the Regional Establishment & Staff Officer, London Midland Region, Euston, has been appointed Assistant Regional Establishment & Staff Officer, Eastern Region, Liverpool Street. He succeeds Mr. A. L. Crewe who, as recorded in our August 26 issue, has retired.

Alderman E. Corrigan has been appointed a member of the Transport Users' Consultative Committee, North Eastern Area.

Lt.-Commander R. B. Lakin has been appointed a Director of Vickers-Armstrongs (Engineers) Limited with effect from September 5, 1960, and General Manager of the North East Works of that company, with effect from September 1, 1960. He succeeds Mr. J. R. Kelly, who is retiring.

Mr. J. Hyde, Air Travel Manager, Thos. Cook & Son Ltd, has been appointed Traffic Manager (Development). Mr. J. Watson, General Manager for the East & Far East, Thos. Cook & Son, Ltd., succeeds Mr. Hyde in the position of Air Travel Manager.

Lord Plowden, Chairman, Sir Geoffrey Crowther, and Mr. H. F. R. Catherwood have been re-elected to the board of the British Aluminium Co. Ltd. Mr. G. A. Anderson, Mr. E. F. O. Gascoigne, and Mr. J. Ritchie have also been re-elected to the board of that company.

Mr. Raj B. Lal, Chief Operating Superintendent of the Northern Railway of India, who, as recorded in our June 17 issue, has been appointed an Additional Member (Commercial), Indian Railway Board, in succession to Mr. S. R. Kalyanaraman who has retired, was born in 1907. He graduated from Allahabad University in 1929, and joined the traffic department of the North Western Railway in July, 1930. Four years later he was transferred to the former East Indian Railway, and was promoted to district rank in 1943. He worked as Superintendent (Claims & Refunds) in Calcutta and Varanasi, and became Deputy General Manager, Road Transport, in 1947, and Deputy Chief Commercial Manager (Special) with headquarters in Calcutta, in 1948. He was appointed Divisional Superintendent in 1950, and served in this capacity until the regrouping of Indian Railways in 1952, at which time he transferred to the Northern Railway. In 1955 he was appointed Chief Operating Superintendent of the Northern Railway.

Mr. J. H. Price has been appointed General Manager of Expandite Limited in Australia (Expandite (Australia) Pty., Ltd.), succeeding

Mr. W. H. Hayman
Appointed Assistant Chief Traffic Manager, New South Wales Government Railways

Mr. W. S. M. Stapleton
Treasurer, Southern Region, British Railways, who is retiring

Mr. G. K. Newman
Appointed Chief Executive Officer, Road Haulage Association

Mr. J. M. Robb, who is returning to the parent company to take up a senior appointment in the Overseas Development Division of the Expandite Group.

Mr. W. H. Hayman, Transportation Manager, New South Wales Government Railways, who, as recorded in our August 26 issue, has been appointed Assistant Chief Traffic Manager, joined the Department of Railways in March, 1915. He has had wide experience in the Traffic Branch in the Western and North Coast Districts and in the Sydney Metropolitan Area and has served as Stationmaster, Traffic Inspector, and Chief Inspector. Since August, 1951, he has been the Assistant Goods Trains Superintendent. For many years Mr. Hayman has given much time to the activities of the New South Wales Centre of the Institute of Transport and he is at present the Convenor of its Education Sub-committee. He passed the Associate Membership Examination of the Institute of Transport in 1939 and was elected to full membership of the Institute in 1953. In 1955 he was appointed Goods Trains Superintendent, and later, Transportation Manager.

Mr. J. R. Hammond, General Manager, Western Region, has accepted the office of President of the Railway Students' Association for 1960-61. He will deliver his Presidential Address at the opening meeting on October 19.

Mr. W. R. Peacock, Senior Representative Cardiff, British Transport Advertising, has been appointed Area Sales Manager, Manchester. He succeeds the late Mr. J. Walker.

Mr. R. H. Thornicroft has been appointed Deputy Manager, Traffic Department, Associated Electrical Industries (Rugby) Limited.

Mr. H. W. Reynolds, Assistant to District Goods Superintendent (Sales), Leeds, North Eastern Region, has been appointed Assistant District Commercial Superintendent (Sales), Middlesbrough.

Mr. W. S. M. Stapleton, Treasurer, Southern Region, British Railways, who, as recorded in our August 26 issue, is retiring at the end of September, entered the Secretary's Office of the former L.B.S.C.R. in 1912. During the 1914-18 war he served with the London Rifle Brigade and Royal Irish Rifles. He joined the Secretary's Office of the Southern Railway on its incorporation in 1923, and, after serving in various capacities in that office, was appointed Private Secretary to the Chairman in 1939. He was Acting Assistant Secretary to the company from April, 1944, to December, 1945, and in 1946 was appointed Registrar. On nationalisation he was responsible for the work of conversion of all the Southern Railway stocks into British Transport stock before the stockholders' accounts were finally transferred to the Bank of England towards the end of 1951. In February, 1952, he was appointed to the position of Treasurer, Southern Region, British Railways, which he will shortly vacate.

Mr. R. S. Allen, Deputy Chairman of W. H. Allen Sons & Company has resigned from the board.

Mr. R. F. Middleton has been appointed Sales Director of the D. A. Stuart Oil Co. (G.B.) Ltd.

Mr. L. B. Robinson and Mr. R. G. H. Linzee have retired from the board of the British Aluminium Co. Ltd.

Mr. J. E. Yates has been appointed General Sales Manager of Lancashire Dynamo & Crypto Limited.

Mr. F. Baillie has been appointed Production Manager of the Cambridge Instrument Co. Ltd.

Mr. T. Nancarrow has been appointed Works Manager of Armstrong Whitworth & Co. (Pneumatic Tools) Ltd.

Mr. S. K. Wheatley has been appointed a Director of the Sheffield Wire Rope Co. Ltd., a member of the Firth Cleveland group.

Dr. R. V. Waterhouse has been appointed managing director of the Acoustical Investigation & Research Organisation Limited, a member of the Hall-Thermotank Group.

Mr. A. R. Jackson has been appointed to the board of the Consolidated Pneumatic Tool Co. Ltd. He will continue to hold the appointment of General Manager of the Australian branch of the company.

Mr. G. K. Newman, who, as recorded in our August 26 issue, has been appointed Chief Executive Officer of the Road Haulage Association Limited, in succession to the late Mr. R. M. Mitchell, who died earlier this year, is a barrister aged 42. He took his degree in law at Pembroke College, Oxford, in 1939, and then served in the Army in staff and regimental appointments until 1946. During the greater part of his military service, both at home and abroad, Mr. Newman was actively concerned with road transport. He was called to the Bar in 1947, and he practised law for seven years until 1954, when he accepted a position as Legal Adviser to a group of commercial companies. Since 1956 he has been engaged in advisory and administrative work in the International Electrical Association, which is an association of British and European manufacturers of heavy electrical plant.

Mr. F. Stothard has been appointed Works Manager, Charles Roberts & Co. Ltd.

Mr. Alfred J. Mann, General Manager, David Harcourt Limited, Linkula Works, has retired.

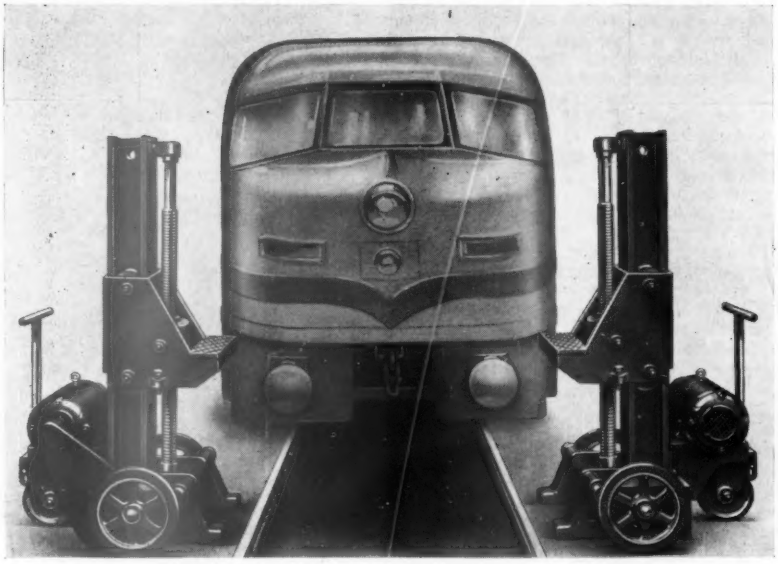
Mr. George Woodcock has been elected General Secretary of the Trades Union Council, and Mr. E. J. Hill has been elected Chairman for the coming year.

Mr. L. C. Maddock, Assistant Chief Accountant of the Thos. Cook group of companies, has been promoted to be Chief Accountant in succession to Mr. Stanley Smith, who has recently retired.

A.E.I. Transformer Division Appointments

The following appointments have been announced by the Transformer Division of Associated Electrical Industries Limited: Mr. D. R. Clegg, to be Manager, Transformer Sales Department (Manchester); Mr. W. S. Perkins to be Manager, Transformer Sales Department (Rugby); Mr. G. J. Hodgkinson, to be Assistant Chief Engineer (Design), Transformer Engineering Department (Manchester); Mr. E. R. Hartill, to be Assistant Chief Engineer (Development), Transformer Engineering Department (Manchester); Mr. G. N. Leech to be Assistant Chief Engineer, Transformer Engineering Department (Rugby).

NEW EQUIPMENT AND PROCESSES



Mobile Railway Lifting Jacks

ATLAS electrically operated mobile lifting jacks for use in railway workshops are designed to be operated singly, in pairs, or in any multiple arrangement. They are the latest addition to the Atlas range of specialised railway machine tools and equipment and are made in capacities of 5, 10, 15, 25, 35, and 40 tons, all basically similar in construction and as shown in the illustration.

All sizes are of fabricated steel construction and electrically operated by a built-in totally enclosed motor. Control is from a remote push-button station carried easily by the operator. This enables a clear view to be obtained of each lifting claw as it makes contact under the lifting point of the vehicle. Where the jacks are used in multiples they are inter-connected; provision is made for individual operation, synchronous operation of all the jacks, or synchronous operation of any pair.

Modifications to the standard claw design and projection, minimum claw height, and lift can be made to suit a wide range of work on steam, diesel, and electric locomotives, and coaches and wagons. Special jacks are also available arranged to traverse on narrow-gauge tracks positioned alongside the main track. On this design the claw is adjustable horizontally by handwheel and the column is fabricated from two heavy channel sections.

The standard jacks are mounted on three rubber-covered wheels, the rear wheel being arranged to swivel for ease of manoeuvrability and controlled by the handle by which the jack is steered and propelled around the workshop. For workshops where there are heavy gradients or uneven floors power drive can be applied to the third wheel by means of a separate electric motor controlled from the steering handle. All three wheels are retracted automatically as the claw elevates so that before the load is applied it is certain that the base of the jack is located securely on the floor.

Downward movement of the claw causes the wheels to be extended so that the jack can be wheeled away on completion of the job. Adjustable stops enable wheel retraction to occur at any position throughout the travel of the claw. The swivel wheel is provided with a brake operated from the handle.

Limit switches are provided to prevent overrunning at the top and the bottom of the travel of the claw. As a precaution against serious accidents electrical interlocks ensure that all jacks stop if any one fails to operate correctly.

The worm-and-wheel drive from the motor is contained in the fabricated steel base and runs in oil. Provision is made for manual operation by hand ratchet lever if the power supply is not available. The elevating screw is keyed to the worm wheel and is carried on a heavy-duty ball-bearing thrust race located in the bottom of the worm box.

The lifting claw, also of fabricated steel, is arranged to lift under the side of the vehicle. It incorporates a nut of the safety type which engages with the elevating screw. If the main operating nut should strip due to wear, the claw will drop only half an inch before being checked by the safety nut, and thereafter rotation of the elevating screw will impart no movement to the claw. This automatically ensures that the main operating nut must be replaced.

It is customary to use the jacks in sets of four to enable complete vehicles to be lifted for major work requiring removal of bogies.

The design provides clearance for the removal of bogies even when lifting of the locomotive or other vehicle is from outboard of the bogie. For repair work as opposed to maintenance, it is usually possible to use only a pair of jacks at one end of the vehicle. Excessive side thrust would occur only with very short wagons in which case a third jack should be positioned between the tracks to fit under the buffer beam at the end opposite to that from which it is desired to remove a bogie or wheel set.

A cross-beam for use between a pair of jacks can be supplied at extra cost; this is anchored on the claws. If necessary, jacks so arranged can be used in sunken runways on both sides of the rail track with a channel cut across the track to accommodate the beam in the bottom position. Short lengths of rail are mounted on the top of the beam at the appropriate gauge to bridge the gaps in the main track. In this way vehicles can readily be run into the lifting position over the beam.

The great value of these jacks lies in their manoeuvrability and the fact that they free the overhead shop crane for other work, or allow heavy maintenance to be carried out in shops where no cranes exist.

Further details may be obtained from the Atlas Engineering Co. Ltd., 28, Princes Gate, London, S.W.7.

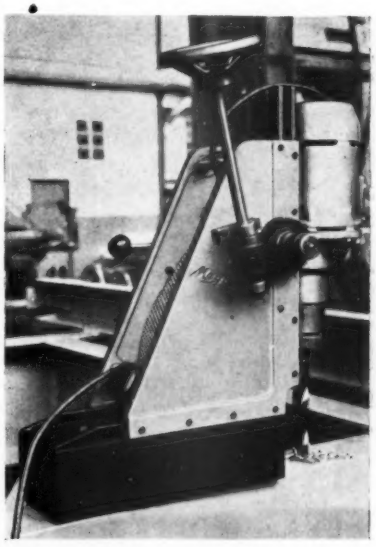
Magnetic Drill-Stands

MAGCODRILL magnetic drill-stands can be placed anywhere on a steel plate or other magnetically inclined material to give some of the facilities otherwise available only with a radial drill costing several thousand pounds.

The drill-stand comprises, basically, a magnet and stand to which can be attached any make of drill, whether air, electric, or high frequency. Setting up is claimed to be simple: the stand is placed in position on the job to be drilled, plugged into the mains supply, and a weak field induced by means of the variable rheostat. This has the effect of clamping the stand to the job in progress yet leaving it sufficiently movable for the head to be accurately centred over the jig, centre-pop, or pilot drilling. Full magnetic force is then induced by turning the rheostat to full power before starting the drilling operation. Use of the stand enables the hole to be accurate within the limitations of the drilling equipment.

The stand is compact and simple. It can be used for vertical or overhead work when a safety chain is fitted, and also for applications where it is impossible to get a normal drilling machine.

An example which illustrates the value of portable operation by the Magcodrill stand is to be seen in the application to drilling dowel-pin holes in the bearings of diesel engine bedplates after they have been lined up. In the past this has meant lifting the

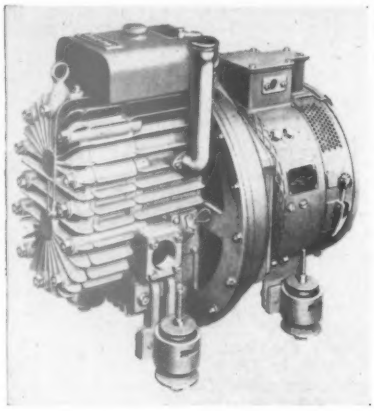


bedplate and taking it to a machine bay for drilling. Now the operation can be carried out in the fitting or erecting shop without moving the work.

The model illustrated is the M.D.2 which takes up to a ¾-in. drill and costs £45. Other models in the range are available to take drills up to 1¼ in. with a corresponding price range up to £75. They can be supplied for use

with any a.c. or d.c. voltage or frequency. Facilities for 1 in. change of radius through an angle of 360 deg. for easy location are also available on certain models.

Further details may be obtained from the manufacturer, Magco Limited, Lake Works, Porchester, Hants.



Improved Rotary Exhauster

NORTHEY type 125 R.E. F.M. flange-mounted exhausters have been produced to meet the exacting requirements imposed by designers of diesel and electric locomotives regarding space and weight limitations for auxiliary units. The result is a compact machine of only 30 in. overall length including the electric motor.

The weight of the exhauster itself excluding motor is only 205 lb. The well-known Northey operational principles are retained and the two balanced rotors mounted on parallel shafts have no rubbing contact with each other or with the walls of the working chamber. Only an extremely small quantity of lubricant is necessary; the makers guarantee at least 1,000 hr. running per gal. of oil used.

For main-line locomotives two exhausters of this size (125 cu. ft. per min. swept volume) are normally installed, but a single machine of 250 cu. ft. per min. is also available if preferred.

Two-speed motors give maintaining and release speeds of 1,250 and 1,850 r.p.m. for the smaller machine, the corresponding power requirements being 4·25 and 6·5 h.p. Each exhauster can maintain 21 in. Hg. vacuum against ⅛-in. leak hole at release speed when running alone.

Northey exhausters are manufactured by Northey Rotary Compressors Limited at Parkstone, Dorset, for Gresham & Craven Limited which is the sole distributor for railway applications. Full details of the complete range, including ancillary fittings, can be obtained from Gresham & Craven Limited, 15, Whitehall, Westminster, London, S.W.1.

Vacuum Snifter Valve

A DIAPHRAGM - OPERATED vacuum snifter valve unit has been designed as part of the improved exhauster equipment now available for diesel and electric locomotives hauling vacuum-braked trains. It completely overcomes the troubles experienced with relief valves of the conventional type which are generally of inadequate capacity and also have a fairly wide range between opening and closing, thus causing serious variations in working vacuum when running. Such variations lead to overcharging of the brake system which in turn causes incomplete release and the resultant dragging of brakes.

It is claimed that the new valve unit will hold the normal working vacuum constant within ¼-in. Hg. irrespective of changes in exhauster speed or differences in leakage rates which are within the capacity of the exhausters used. Because it is remotely controlled by the true vacuum conditions existing in the main brake pipe, the valve is unaffected by local conditions in the immediate vicinity of the atmospheric admission valve. Only one valve is required on a locomotive even if two exhausters are used. Adjustment can be made to suit any required working vacuum up to 25 in. Hg.

Special features include:—

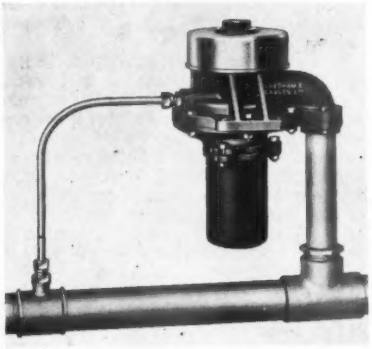
(i) The valve is sensitive to extremely small changes in vacuum as the area of the diaphragm is very large relative to the area of the valve;

(ii) The 1¼-in. dia. atmospheric valve is able to cope with the largest exhauster capacity and the use of a rubber-seated valve ensures air-tightness of the brake system when the exhausters are shut down;

(iii) The design avoids premature opening of the valve; this feature assists brake release;

(iv) The large copper gimp filter prevents dirt and oil from entering the vacuum-brake system. It is possible for this to be cleaned easily by washing the element in paraffin.

Further details may be obtained from the manufacturer, Gresham & Craven Limited, Salford, 5, Manchester, and at 15, Whitehall, Westminster, London, S.W.1.



Modules for Illuminated Ceilings

TWO new three-dimensional patterns have been added to the range of translucent plastic modules available for use with illuminated ceilings designed on the Lumenated Module lighting system as described in our August 5, 1960, issue.

Each has an angular fluted appearance achieved by a series of wedge-shaped formations across the module. Of the two types available with this pattern, one (type S9) has the fluting running from side to side, while the other (type S10) has the fluting obliquely, on a corner-to-corner axis. Both patterns can be supplied for use in either the 2-ft. or 3-ft. version of the Lumenated Module lighting system in which the translucent panels allow very high levels of artificial illumination to be achieved without glare.

Further details may be obtained from Lumenated Ceilings Limited, Alliance House, Caxton Street, London, S.W.1.

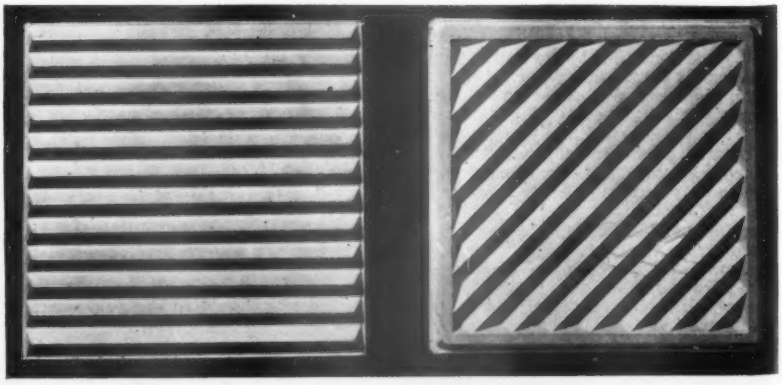
Multi-Range Meter

THE Multimeter 105a is a robust multi-range meter with a high sensitivity of 20,000 o.p.v.

It has a total of 21 self-contained ranges, current readings from 60 μA to 12A. in six ranges, d.c. volts from 0·3 to 1,200 in seven ranges, a.c. volts from 12 to 1,200 in five ranges, and resistance from 0 to 20 megohms in three ranges, self-contained.

A clear 5-in. scale is calibrated in three colours. The instrument incorporates a new centre-pole movement of rugged construction; this is assembled in a smoothly-contoured bakelite moulding. An alternative version incorporating an overload cut-out is also available. Extra equipment which can be supplied includes a high-voltage adaptor for readings up to 30 kV., and a high-quality leather carrying case.

Further details may be obtained from the manufacturer, Taylor Electrical Instruments Limited, Montrose Avenue, Slough, Bucks.



Manchester-Crewe Electrification Inaugurated

Formal opening of electrified services operating on the 25-kV. 50-cycles a.c. system

The Minister of Transport, Mr. Ernest Marples, inaugurated the Manchester–Crewe main-line electrified services of British Railways, London Midland Region, last Monday. The 31 route-miles have been electrified at 25 kV. 50 cycles a.c. and this scheme is the first stage in the electrification of the Euston–Birmingham–Manchester and Liverpool lines. Mr. Marples, who was introduced by Sir Brian Robertson, Chairman, British Transport Commission, emphasised, at the inauguration ceremony at Manchester Piccadilly Station, the nation's need for railways. It was wishful thinking, he stated, to expect the commuting population of Britain's vast conurbations to be moved by private road vehicles. In London 6 per cent entered by private and 94 per cent by public transport. It would be physically impossible to deal with the traffic without the railways. The Commission, he continued, was right to alter quickly the methods of traction. Steam was on the way out and electrification and diesels were on the way in, and the quicker the better.

Heavy Work Involved

Technically, the Minister added, the Manchester–Crewe section had involved major engineering work. The entire track had been re-laid on deep ballast. Eighty-eight bridges had been altered. The Commission's technical staff were to be complimented on a fine technical performance carried out with skill and devotion. But they must not forget that railways all over the world faced formidable competition from road transport. In the mid 1960's Britain would have a network of trunk roads and motorways affording flexibility, speed, and mobility to road transport. "The railways" he concluded "will have to meet that competition with determination, commercial skill, financial judgment, and technical shrewdness. The Government will do all it can to make it possible for the railways to play their part."

Others present at the inauguration included:—

British Transport Commission: Mr. K. W. C. Grand, Mr. J. Ratter and Sir Philip Warter, Members; Major-General Ll. Wansbrough-Jones, Secretary General; Messrs. H. L. Brazier, Chief Secretary; H. E. Osborn, Financial Adviser; T. H. Hollingsworth, Traffic Adviser; J. H. Brebner, Public Relations Adviser; S. B. Warder, Chief Electrical Engineer; A. W. Woodbridge, Chief Signal Engineer; J. A. Broughall, Electrical Engineer; E. Claxton, Asst. Electrical Engineer (Development); J. S. Campbell, Assistant Civil Engineer (Works), representing Mr. C. W. King, Chief Civil Engineer;

London Midland Area Board, B.T.C.: Sir Reginald Wilson, Chairman; Mr. J. Haworth, Colonel Sir Basil McFarland, Bt., Lord Rusholme and Mr. R. F. Summers, Members;

London Midland Region, British Railways: Mr. David Blee, General Manager; Messrs. A. J. Pearson, Assistant General Manager; H. Aidley, Regional Establishment & Staff Officer; E. G. Brentnall, Signal Engineer; A. N. Butland, Chief Civil Engineer; G. S. Calder, Electric Traction Engineer (Crewe); R. W. Crawshaw, Public Relations & Publicity Officer; C. G. Derbyshire, Assistant Signal Engineer (Modernisation);

Messrs. George Dow, Divisional Traffic Manager, Birmingham; A. H. Emerson, Electrical Engineer; J. Fairclough, District Operating Superintendent, Crewe; P. J. Fisher, Line Traffic Officer (Operating), Crewe; S. H. Gould, Operating Officer; W. E. N. Growdon, Chief of Police; W. R. Headley, Architect; L. R. Insley, Divisional Signal Engineer; J. A. Knapman, District Motive Power Superintendent, Manchester;

Messrs. F. L. Lambert, Chief Electrification Project Officer; M. G. E. Lambert, Divisional Traffic Manager, Liverpool; A. Lloyd Owen, New Works Officer; A. G. Minty, Line Traffic Officer (Motive Power); T. W. Polding, District Passenger Manager, Manchester; G. E. Procter, Senior Resident Engineer (Construction), Manchester;

Messrs. A. M. Y. Robb, District Operating Superintendent, Manchester South; A. E. Robson, Chief Mechanical & Electrical Engineer; R. Roscoe, District Engineer, Crewe; J. Royston, Divisional Traffic Manager, Manchester; P. F. Shute, Divisional Signal Engineer; K. Taylor, Electric Traction Engineer, Manchester; G. E. Woodhead, District Engineer, Manchester;

Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport;

Mr. L. M. Lever, Mrs. E. Hill, Messrs. F. Blackburn, H. M. Steward and C. Mapp, M.P.s. respectively for Ardwick, Wythenshawe, Stalybridge, Stockport and Oldham (East);

The Lord Mayor of Manchester; the Mayors of Crewe, Salford and Stockport; the Chairman of Alderley Edge U.D.C., Cheadle & Gatley U.D.C., Congleton R.D.C., Sandbach U.D.C., Wilmslow U.D.C.; the Chief Constable of Lancashire;

Sir John Elliot, Chairman of the Pullman Car Co. Ltd.; Messrs. J. L. Simons, President, and M. J. Evans, General Secretary, A.S.L.E. & F.; Mr. R. J. Gunter, President, T.S.S.A.;

Messrs. W. C. Parker, Regional Director, N.W. & N. Wales Central Electricity Generating Board; T. E. Daniel, Chairman, N.W. Electricity Board; Frank Kenyon, Chairman, N.W. Electricity Consultative Council; A. P. H. Aitken, Chairman, N.W. Region, Federation of British Industries; Colonel G. C. H. Bolton, N.W. Division, National Coal Board;

Messrs. Leonard Fairclough, Leonard Fairclough Limited; A. E. Parkinson, Sir Lindsay Parkinson & Co. Ltd.; M. F. M. Wright, Butterley Construction Co. Ltd.; T. S. Rawlinson, E. B. Jones & Rawlinson Limited; B. Le Mere, North West Construction Co. Ltd.;

Messrs. T. J. Aldridge, Westinghouse Brake & Signal Co. Ltd.; O. J. Crompton, D. Rooney and G. A. Wallace, British Insulated Callender's Construction Co. Ltd.; L. M. Browne and F. Rowland, Switchgear & Cowans Limited; W. B. G. Collins and D. Jones, Associated Electrical Industries Limited; A. Thomas, Bertram Thomas (Engineers) Limited; F. A. Pope, Automatic Telephone & Electrical Co. Ltd.;

Messrs. D. Morton, General Electric Co. Ltd.; H. J. H. Nethersole, English Electric Co. Ltd.; H. G. Jenkins, Lewis's Limited; C. F. Barnard, Mirrlees, Bickerton & Day Limited.

L.T.E. One-Man-Operated Bus

Three one-man-operated buses of a new type have been delivered to London Transport Executive and are to go into service between Watford and Hemel Hempstead. They have separate front entrances and centre exits, both closed by power-operated doors under the control of the driver. The separate exit allows intending passengers to enter the bus and pay their fares to the driver without waiting for other passengers to alight.

The new buses, to be known as the RW type, have Willowbrook bodies mounted on A.E.C. Reliance chassis and are 30 ft. long and 8 ft. wide with a 16-ft. 4-in. wheelbase. The bodywork, virtually of the standard Willowbrook metal-framed design, is of lightweight construction. It incorporates high-level windows above the cantrail on each side for the convenience of standing passengers. Each bus seats 42.

The power unit is an A.E.C. 7·7-litre under-floor-mounted engine developing 100 b.h.p., and driving through a fluid flywheel and epicyclic gearbox. An A.E.C. electro-pneumatic mono-control is fitted whereby movement of a miniature gear lever mounted on the steering column causes the required gear to be engaged. The passenger-driver bell will be operated by continuous pneumatic strips running down the whole length of the bus, taking the place of the familiar cord.

One-class Ship for Channel Islands Service

In January of this year ss. *Caesarea* was launched at the Cowes, Isle of Wight, shipyard of J. Samuel White and Co. Ltd. Designed for the Channel Islands services of British Railways the vessel will be in operation towards the end of 1960. A sister ship, the *Sarnia* was launched at the same yard on September 6 by Mrs. W. H. Arnold, wife of the Bailiff of Guernsey.

The two vessels are twin-screwed and propelled by steam turbines. They will be the largest ever built for the Channel Islands routes.

One-class Travel

One-class travel is one of many special features. There will be 110 berths in private cabins and lounges. Nearly all seating will be under cover and some seats will be of the reclining type.

Principal dimensions of the *Sarnia* are: Length overall, 321 ft.; length between perpendiculars, 302 ft.; breadth (moulded), 51 ft.; draught, 13 ft. 6 in. Dead weight is 640 tons, gross register 3,800 tons, and speed 20 knots.

Accommodation will be provided for 1,400 passengers and special attention has been given to the catering arrangements to ensure rapid service.

To provide the maximum protection against fire hazard there is a complete Grinnel sprinkler system in all spaces and all divisional bulkheads, and linings are mainly of Marinite, a fire resistant material. Life-saving apparatus includes six glass-fibre lifeboats designed and constructed by the shipbuilders.

Propulsion Machinery

The propulsion machinery consists of two, single-casing steam turbines designed by the Parsons & Marine Engineering & Turbine Research Association (Pametrada). Each turbine will drive a three-bladed Novoston alloy propeller through articulated locked-train, double-reduction gearing. Impulse blading is fitted in the turbines and the ahead and astern blading is on the same shaft.

Steam for the turbines is supplied at 350 lb. per sq. in. and at 650° F. by two Foster Wheeler oil-fired, watertube boilers.

Two Denny-Brown ship stabilisers will greatly reduce rolling and the vessel's manoeuvrability is improved by fitting a bow rudder besides the conventional rudder at the stern. The *Sarnia* should enter ser-

vice between Weymouth and the Channel Islands in the Spring of 1961.

At a luncheon following the launch, Sir Philip Warter, Member of the British Transport Commission and Chairman of the Southern Area Board, referred to the ordering of the *Caesarea* and *Sarnia* as acts of faith on the part of British Railways.

A decision on the proposed Channel Tunnel, he added, was still awaited. He expressed the hope that J. Samuel White & Co., Ltd. would be in the forefront in tendering for the new cross-Channel train ferries when these were needed.

Diesel Maintenance Fitters' School at Stratford

A school for training diesel maintenance fitters was opened at Stratford Works on September 12, by Mr. H. C. Johnson, General Manager, Eastern Region, British Railways. It is situated in the former brass-finishing shop, now redundant, above the main erecting shop. Instruction is given in all aspects of diesel maintenance work, mechanical and electrical.

The intention is to train nearly 1,000 staff: fitters, electricians, and allied tradesmen. Each course, which lasts three weeks, can be attended by 12 students, but as provision has been made for three concurrent sessions, 36 men can be trained in the school at one time.

Preventive Maintenance

In the demonstration area practical instruction will be given, using actual or simulated equipment. The purpose is to stress the importance and outline the problems of preventive maintenance. One of the three classrooms is fitted for showing training films.

The school is administered by the Chief Mechanical & Electrical Engineer, Eastern Region, Mr. T. C. B. Miller, in co-operation with the appropriate officers at the headquarters of the Line Traffic Managers of the Great Northern and Great Eastern Lines. Mr. P. Gray, Works Manager, Stratford, provides the necessary services, and the school is under the immediate control of Mr. C. Beaumont, Chief Instructor, assisted by Mr. W. Bates and Mr. E. Finlay.

SCHOOL WAS OFFICIALLY OPENED 12TH S
BY H.C.JOHNSON ESQ. O.B.E.
GENERAL MANAGER EASTERN REG
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TO FURTHER THE KNOWLEDGE OF DIESEL
ON THE EASTERN REGION OF BRITISH
WE HOPE FROM YOUR VISIT HERE, YOU PERSO
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At the opening of the Stratford diesel maintenance fitters' school: Mr. H. C. Johnson with (left to right) Messrs. C. Beaumont, T. C. B. Miller, and P. Gray

Remote-Control on Naples Local Line

The electrified Cumana Railway, from the Montesanto Station, Naples, to Torregavetta, is being equipped by Siemens & Halske Akt. with a simplified remote-control installation for the points and signals of the 16 stations on the line. The installation is based on the so-called "EDr technique," which has proved to be satisfactory on lines with simple operating conditions in Germany and elsewhere.

In general, the stations have only one through road and one passing loop, and the points at both ends of the station are operated electrically. In locations where there are additional points for shunting operations, these are thrown by hand, but are locked electrically. There is no longer any need for signalmen at the stations. Signals and electrically-operated points can be remote-controlled from the central control room.

Local Switchboards

For shunting movements which are carried out by the train crew, the electrically-operated points can be controlled locally from small switchboards. Safe passage of the train and "line clear" are verified, on

Demonstration of Combined Rail-and-Road Vehicle

(See last week's issue and further editorial reference this week)

Transfer mechanism of Roadrailer being operated by compressed air to lower rail wheels

Railway adapter bogie being attached to leading Roadrailer which has just been positioned by road-motor vehicle on left

the different sections, by magnetic impulse receivers which give an indication on the block apparatus.

New Signalling in Operation on District Line

The fourth stage in the resignalling of the District Line of London Transport Executive between Bow Road and Upminster was reached last week-end. New signalling of L.T.E. type was brought into use over a further three miles of route. The first three stages, already completed, have covered the line from Campbell Road Junction, east of Bow Road, to a point between Upney and Becontree; the third stage was completed in April.

The London Transport standard two-aspect signalling brought into use on the night of September 10, serves the line from the point already reached in previous stages to a point between Dagenham East and Elm Park.

Points and signals at Dagenham East, where some trains terminate in a bay platform, are operated by an interlocking machine installed at the west end of the station and remotely controlled from the L.T.E. signal-box at Barking, where additional push-buttons have been added.

To the east of Dagenham East station, on the north side of the tracks, is a private siding serving the chemical works of May & Baker Limited which will continue to be served by British Railways, Eastern Region, goods trains which use the L.T.S. Line tracks alongside those used by the District Line trains. The goods trains must cross the District Line tracks to reach the siding, and special arrangements have been made to make it necessary for the London Transport signalman at Barking and the Eastern Region signalman at Dagenham East to work in conjunction.

Staff and Labour Matters

Railway Shopmen's Pay Claim

The Chairman, Sir Brian Robertson, and other representatives of the British Transport Commission resumed discussions on September 13 with the employees' side of the Railway Shopmen's National Council on rates of pay of railway workshop staff. An offer was made by the Commission to settle the claim on the basis that the rates of pay of railway shopmen should be increased by amounts equivalent to 3 per cent additional to the 5 per cent awarded as from January 11, 1960, and from the same date.

The meeting was adjourned for the trades union to consider the offer. A further meeting is to be held on September 21.

Shortage of L.T.E. Bus Crews

Representatives of London Transport Executive and of the Transport & General Workers' Union had long discussions on September 13 on ways of dealing with the shortage of bus crews. The shortage, which is disrupting bus services, now amounts to some 6,000 drivers and conductors. The union leaders consider that the only satisfactory remedy is to improve rates of pay and conditions of service. This would help to retain existing staff and attract recruits.

Certain proposals, which have not been disclosed, were put forward by the L.T.E. representatives. The union has asked for some points to be clarified. A further meeting is to be held today, September 16.

Contracts and Tenders

Rolls Royce engine-converter sets for the Swedish State Railways

Rolls-Royce Limited has received from Kalmar Verkstads A.B. an order for 50 engine-converter sets for installation in new shunting locomotives for the Swedish State Railways. Each set is to comprise a model "C8TFL" turbo-charged eight-cylinder quick-running engine and a Rolls-Royce/Twin Disc hydrokinetic torque converter.

The General Electric Company (U.S.A.) has received an order for seven 1,320-b.h.p. diesel-electric locomotives for the 180-mile 3-ft. 6-in. gauge railway being built to connect the properties of the Cie. Minière de l'Ogooué with the Congo-Océan Railway.

Twenty-two electric cranes have been ordered by British Transport Docks for Grange Dock, Grangemouth. Contracts have been awarded to Stothert & Pitt Limited, of Bath, for 16 6/3-ton and two 10/3-ton cranes, and to Cowans Sheldon & Co. Ltd., Carlisle, for four 7½/4-ton units capable of dealing with general traffic or discharging bulk dry cargo by grab. The new appliances are part of the major scheme announced earlier this year for the modernisation of the Tongue berths and the South Quay at Grange Dock.

British Railways, North Eastern Region, has placed the following contracts :—

Drummond Asquith Limited : provision and installation of carriage washing machine at Hammerton Street Motive Power Depot, Bradford

W. Birch & Son Ltd. : construction of fuel tank enclosures and pumphouse at York Motive Power Depot

J. W. Potts : renewal of electric wiring of 85 railway houses at North Blyth

The Berwick Building Company: provision of power houses at Alnmouth and Morpeth

Holman Bros. Ltd.: tractor mounted air compressors and accessories for the Chief Civil Engineer's department

Matisa Equipment Limited: rail saws and drills for the Chief Civil Engineer's department

The Hymatic Engineering Co. Ltd.: Hymatic Hydrovane mobile compressors for the Chief Civil Engineer's department

Raines (H. & V.) Limited : provision and erection of a low-pressure hot-water heating system, hot and cold water services and ventilation plant in a new office building at Paragon Station, Hull

W. Latimer & Co. Ltd.: painting of King Edward Bridge, Newcastle, Wear Bridge and Queen Alexandra Bridge, Sunderland

Dow-Mac (Products) Limited: supply and delivery of pre-cast concrete units for bridge No. 39, Cod Beck, on the York–Newcastle line

Pavior Construction Limited: raising of the superstructure of bridge No. 19A near Hampolle, on the Doncaster–Leeds line

Cleveland Bridge & Engineering Co. Ltd.: reconstruction of bridge No. 29, Benfield Road, near Heaton, on the Newcastle–Berwick line

The Mitchell Construction Co. Ltd. : construction of a temporary signalbox for the new marshalling yard at Lamesley

Tarslag Limited: provision of pre-cast concrete units in connection with the reconstruction of bridge No. 145 near Lucker on the Newcastle–Berwick line.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From India :

4,000 sets of insulation rail joints 90 lb. R.F.F. B.S.S. complete with the channel side plates, end post and bush to I.R.S. drg. Nos. T-305 alteration 1, T-306 alt. 1 and T-304 alt. 1 and to B.S.S.216 and to specification.

The issuing authority is the Director General of Supplies & Disposals, Shahjahan Road, New Delhi, to whom bids should be sent. The tender No. is WPI/18606-L/II. The closing date is October 11, 1960. The Board of Trade reference is ESB/23525/60.

20,633 wheelsets, broad gauge, 16-ton axle load, completely assembled, suitable for plain bearings

1,994 wheelsets, broad gauge, 16-ton, axle load, completely assembled, suitable for roller bearings

2,027 wheelsets, metre gauge, 12-ton axle load, completely assembled, suitable for plain bearings

400 wheelsets, narrow gauge, 8-ton axle load, completely assembled, suitable for plain bearings.

The issuing authority is the Director, Railway Stores, Railway Board, State Entry Road, New Delhi-2, to whom bids should be sent. The tender No. is G.P.24 of 1961-62. The closing date is September 2, 1960. The Board of Trade reference is ESB/23730/60. Photo-copies of documents are not available at the Board of Trade.

30,000 tons of 90R rails.

The issuing authority is the Director, Railway Stores, Railway Board, State Entry Road, New Delhi 2, to whom bids should be sent, quoting tender No. S.9. United Kingdom firms interested in this call for tenders can obtain sets of the documents upon direct application to the Office of the Director-General, India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3. The closing date is October 11, 1960. The Board of Trade reference is ESB/23731/60.

From Portuguese East Africa :

13 items of spares for locomotives, including coupling knuckles, superheating elements, couplings, piston rods, springs, fireclay bricks, smoke tubes, and so on.

The issuing authority is the Ports, Railways & Transport Department, Lourenco Marques to whom bids should be sent. The tender No. is 145/60. A provisional deposit of Esc. 15,000 must be made by tenderers. Drawings and specifications are obtainable from the Railway Warehouse at Lourenco Marques through the local agents of United Kingdom firms interested. The closing date is September 30, 1960. The Board of Trade reference is ESB/23464/60.

From Thailand:

2,000 pairs of fishplates for 60-lb. rails as per specification

The issuing authority is the State Railways of Thailand, Yod-Se, to whom bids should be sent. The tender No. is 03334. The closing date is October 3, 1960. The Board of Trade reference is ESB/22831/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

The New Zealand Government Railways is calling for tenders for various d.c. neutral plug-in relays and mounting bases for rail-

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way signalling. The closing date is November 16, 1960, in Wellington. For further details, see the official notice on page 348.

Notes and News

Last Voyage of British Railways Steamer.—On September 13, the British Railways ss. *St. Helier* made its last mail and passenger-carrying journey from Jersey and Guernsey to Weymouth, after 35 years' service.

Philips Electrical Conference at Brighton.—A conference for sales staff has been arranged by Philips Electrical Limited at Brighton on September 19-21. The growing potential of lighting applications in Britain will be examined and discussed.

U.S.S.R. Railway Wagons.—Besides the types of wagon mentioned on pages 293 and 294 of our September 9 issue, the U.S.S.R. Railways are stated to have placed in service a large number of 93-ton 12-wheel wagons for coal and ore traffic. A high proportion of the Russian goods stock is believed by some visitors to the U.S.S.R. to be fitted with automatic centre couplers.

Höllental Line.—Conversion of the Höllental line, in South Germany, from 50-cycle to 16·6-cycle electrification has meant that regular steam haulage has only now been eliminated. There were not enough 50-cycle locomotives to handle all the traffic and as a result the "85" class 2-10-2T engines continued working trains until recently. Editorial reference to this conversion from the original 50-cycle system was made last week.

British Exhibits at Brno Fair.—British exhibits at the trade fair at Brno, Czechoslovakia, which opened earlier this week and continues until September 25, include: electronic laboratory and industrial equipment by the Cambridge Instrument Co. Ltd.; dynamo meters by Heenan & Froude Limited; drilling machinery by Holman Bros. Ltd.; fork-lift trucks by Lansing Bagnall Limited; tractors by Massey-Ferguson (United Kingdom) Limited; and models of various engineering processes by Guest Keen & Nettlefolds Limited. Czech engineers and officials attending the recent machine tools exhibition at Olympia are reported to have stated that they would enlarge their engineering industry by 72 per cent during the next five years. Among principal requirements would be railway workshop equipment, also machine tools, notably gear cutting machines and grinders.

German Steam Locomotives.—During 1959 comparatively high average mileage was attained by the coal-burning and oil-burning 4–6–2 steam locomotives of the German Federal Railway, rising to the very high peak of 28,700 km. (17,800 miles) by a coal-burning 01-class locomotive in the Kassel area. In the 1960 summer timetables the scheduled workings were up to a maximum of 936 km. (581 miles) a day.

American Diesels.—Mr. Wm. S. Morris, president of Alco Products Inc., said recently that nearly half the current stock (about 28,500 locomotive units) of diesel locomotives on U.S. railroads was built from 1947 to the end of 1951, and the railroads were now entering a period when a great portion of their locomotive fleets would be in the age bracket requiring major overhaul. Mr. Morris believes the economic life of a diesel locomotive to be in the neighbourhood of 15 years.

Mail Traffic on Russian Railways.—According to a report from some recently returned American visitors, mail traffic on the U.S.S.R. Railways is extremely small. At one terminal in a city of 800,000 inhabitants there were no more than two vans of mail a day being handled; and this mail was packed in sealed paper bags.

Henschel Celebrations.—On October 15, Henschel-Werke G.m.b.H. is holding a function to mark the 150th anniversary of the company. For nearly 40 years after its foundation in 1810 the firm was mainly a general engineering and foundry concern. The first locomotive was built in 1848, and in 1959 the 30,000th locomotive was completed. Construction of road lorries and buses began in 1925, and the 60,000th unit left the works in the Spring of this year. At the end of 1957 the remaining members of the Henschel family withdrew from the firm, until that time known as Henschel & Sohn, and the business was re-constituted as a private limited company under the name of Henschel-Werke G.m.b.H.

New Bogie.—A method of interconnecting the spring bearers of a swing-bolster bogie which saves space compared with conventional methods has been patented by the English Electric Co. Ltd. (patent no. 845,770).

Fire in Motor Unit of Electric Train.—One of the motors of a multiple-unit electric train on the Liverpool Street to Shenfield line, Eastern Region, British Railways, caught fire. The driver stayed in his smoke-filled cab and drove the train on to Romford where passengers were transferred to another train after a delay of only 5 min.

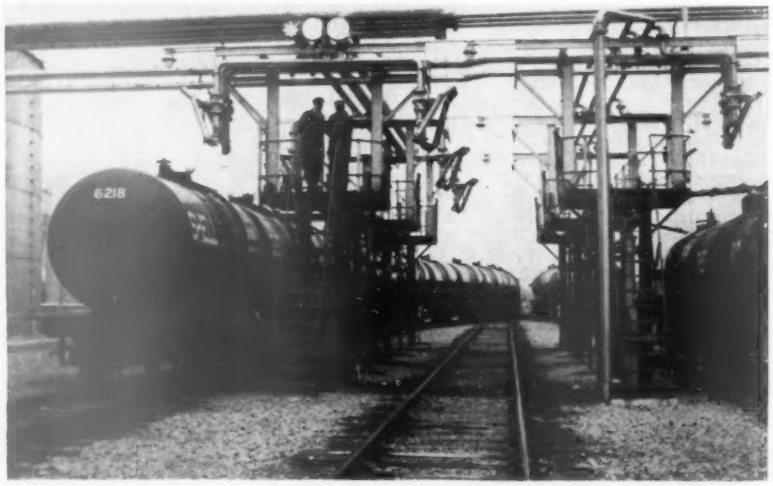
Railway Apprentices' Examination Success.—Apprentices from four Regions of British Railways recently distinguished themselves in an examination in mechanical subjects. In 1956, they were the the first intake accepted into the sandwich course jointly operated by British Railways and the Derby & District College of Technology. The course lasts five years, and is of university degree standard. In the fourth year the students sit for the Higher National Diploma in mechanical engineering. Throughout the course, they spend five months in each year at the college and the rest of the time in British Railways workshops in their home Regions. This year, 11 sat for the Higher National Diploma, and five of them gained distinctions.

D.S.I.R. Ergonomics Conference.—The Ergonomics Conference, organised by the Department of Scientific & Industrial Research, will be held at the Connaught Rooms, London, W.C.1, on September 27-29. Among the subjects discussed will be improvement of industrial efficiency by the design of equipment, the operation of which is within the mental and physical capacities of the average person. The conference will be opened by Lord Hailsham, Minister for Science, at 10 a.m. on September 27. The programme includes a talk on the place of ergonomics in industry by Mr. L. G. Norman, Chief Medical Officer, London Transport Executive. Ergonomic principles already have been applied to industrial problems, ranging from the design of instrument panels and machine controls to the measurement of mental and physical work and the prevention of accidents. Practical examples can be seen at an exhibition linked with the Conference at the Connaught Rooms, and there will also be special half-hour demonstrations at 2 p.m. each day.

Electrification of Chesham Branch Commemorated.—Electric working began and steam working of passenger trains ended on the Chalfont & Latimer to Chesham branch of the Metropolitan Line, London Transport, on the night of September 11/12. To mark the occasion, London Transport Executive held a reception in the Council Chamber, Chesham, on September 10. Those present included Mr. A. H. J. Baines, Chairman, and other members of the Chesham U.D.C.; Messrs. R. M. Robbins, Secretary & Chief Public Relations Officer; A. W. Manser, Chief Mechanical Engineer (Railways); A. J. Webb, Assisting Operating Manager (Railways); A. C. Edrich, Civil Engineer (Maintenance); J. Graeme Bruce, Mechanical Engineer (Running—Railways); and F. D. Rose, Public Relations Officer, L.T.E.; and Mr. R. L. E. Lawrence, Divisional Traffic Manager, London, British Railways, London

Bulk Transport of Fuel Oil

(*See our issue of September 2*)



Loading 20-ton tank wagons with heavy fuel oil at the Shell-Mex & B.P. Limited Jarrow installation before departure for Consett

Midland Region. Mr. Robbins, welcoming the guests, explained that Mr. A. H. Grainger, Deputy Chairman & Managing Director of L.T.E., was prevented by illness from attending. He went on to refer to the great improvements which would result from extension of electrification from Rickmansworth to Chesham and Amersham. Mr. Baines replied on behalf of Chesham Urban District Council. After the reception guests were taken from Chesham to Chalfont by special train hauled by an 0-4-4 T locomotive, No. L44, of the former Metropolitan Railway; the coaches were "Ashbury" stock, built at the end of the century by the Ashbury Iron & Steel Co. Ltd. or by Cravens Limited. At the invitation of Mr. Robbins, Mr. Baines hung a victor's laurel wreath on the front end of the locomotive.

Fuelling Equipment.—The automatic tank shut-off valve of Flight Refuelling Limited, has been accepted as standard equipment on the 22 Deltic diesel-electric 3,300 b.h.p. locomotives now under construction at the Vulcan Foundry for British Railways.

Cable Contract Award to A.E.I.—A contract valued at more than £500,000 for the cable installation of the new Spencer steelworks being built by Richard Thomas & Baldwins Limited at Newport, has been awarded to Associated Electrical Industries Limited. The contract calls for the supply and installation of 41½ miles of cables.

New Association for Machine Tool Trades.—A new research association, sponsored by the Machine Tool Trades Association, is being formed to serve the British machine tool industry. It will administer funds contributed by the industry for research projects in machine tool design and production. About 100 manufacturers have undertaken the financing of the new association for a minimum of five years.

Improved Standard of Cleanliness Sought on Railways.—A campaign against litter and dirt on railway property has been advised by the Central Transport Consultative Committee. The Chairman of the Committee, Sir Ronald Garrett, stated that much could be done to improve the standard of cleanliness on trains and at stations, and he complained that in many cases the cleaning apparatus provided was inadequate. Attention was also drawn to the loss of rail freight traffic to road transport.

Labour M.P. Criticises Sale of Steel Firm.—Mr. F. Lee, M.P. for Newton, Lancs., and a Labour Party front bench speaker on questions affecting the steel industry, on September 12 criticised the Government for the sale by the Iron & Steel Holding & Realisation Agency of the Staveley Iron & Chemical Co. Ltd., to Stewarts and Lloyds Limited. He stated that there would be a loss to the public of £2 million. Such a method of sale to private enterprise, he added, more particularly when the House of Commons was in recess, was undemocratic, and "the worst form of dogmatism."

British Standard for Oil Circuit Breakers.—A new British Standard publication, BS.936: 1960, Oil Circuit Breakers for Medium-Voltage Alternating-Current Systems, is a revision of the war emergency (1940) edition and is generally in line with other specifications for switchgear, such as BS.116 and BS.3078. The requirements for making capacity, breaking capacity, and short-time current tests have been revised with the object of formulating what has become established as good practice in the technique of making the tests and assessing the results so that greatest uniformity may be achieved. The standard applies to three-pole circuit breakers suitable for use on three-phase industrial and supply distribution systems having voltages up to 660 and breaking currents not exceeding 43.3 kA. The circuit breakers are intended for use in those parts of a system where marked asymmetry in short-circuit currents cannot occur and where short-circuit operating duty requirements and re-striking voltage conditions are less severe than those envisaged for circuit-breakers complying with BS.116—the standard for oil circuit-breakers for alternating current systems. Copies, price 15s. may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

Russian Aid for Building U.A.R. Railways.—The U.S.S.R. is to give technical aid to the United Arab Republic in constructing new railways to develop oil and other mineral resources in Syria.

U.S.S.R. Help in Guinea Railway Reconstruction.—The Government of the U.S.S.R. is to assist that of Guinea in reconstruction of the metre-gauge Guinea Railways from the port and capital Conakry to Kankan, about 410 miles inland.

Railway Recruiting Posters.—The poster illustrated was produced by the Public Relations & Publicity Department of the Western Region, British Railways; it was designed by Fleet Illustrating Limited as part of the present recruitment drive. A similar poster depicts the work of signalmen and shunters. Printing in four colours was by E. J. Day & Co. Ltd., and 1,500 copies are being distributed throughout the Western Region.

British Standard for Files and Rasps.—A new British Standard publication, BS.498, Files & Rasps, Part 1: 1960, Rasps and Engineers' Files, is a revised edition of the 1933 version which was restricted largely to the specifying of dimensions and tolerances. Clauses on materials, manufacture, testing, marking, and packaging have been included and dimensions and tolerances have been substantially revised to align with certain I.S.O. (International Organisation for Standardisation) draft recommendations, and to bring them into closer agreement with American specifications. No completely satisfactory method of machine testing has yet been devised but the material and the hardness values of hand provers and test bars are specified. Copies, price 8s. 6d., may be obtained from the British Standards Institution, 2 Park Street, London, W.1.

Trans-Zambesia Railway Co. Ltd. Results.—At the annual general meeting of Trans-Zambesia Railway Co. Ltd., held in London on September 7, the Chairman, Mr. V. L. Oury, stated that operating receipts for the year ended December 31, 1959, amounted to £1,107,990, compared with £1,107,571 for the previous year. Expenditure, including Provision for Renewals, was £824,311 (74·40 per cent of the gross receipts) compared with £829,227 (74·87 per cent) for the previous year. The net operating surplus was £283,679 compared with £278,344 for the year 1958. The tonnage of goods carried amounted to 789,194 tons compared with 805,058 tons in the previous year, a decrease of 2 per cent. Goods traffic revenue had increased by £14,706.

Executive Meeting held in Railway Coach.—British Railways, Southern Region, recently made available an inspection saloon as a "conference coach" for the regional executive meeting of representatives of Associated Industrial Consultants Limited. The special coach joined the regular Victoria-Dover train at Redhill, and then made a special stop at Godstone to pick up the A.I.C. consultants. Their meeting began almost immediately and continued until the train reached Dover, where the consultants visited a number of sites for first hand information on the progress of A.I.C. assignments. In the late afternoon the passengers rejoined their train to resume their meeting on the return journey to Godstone.

YOUR HAND IS WANTED
HERE
ENGINE DRIVERS
British Railways offer you interesting employment in a variety of jobs with good opportunities for advancement
HERE
GOODS GUARDS
NOT JUST A JOB-IT'S A CAREER
ASK YOUR NEAREST STATIONMASTER FOR PARTICULARS

One of two four-colour posters produced by the Western Region, British Railways

All-Aluminium Road Motor Tank Vehicle.—By using an all-aluminium structure which combines tank-body, cab, and chassis all in one unit, a new 4,000-gal. Autotanker rear-engined road-motor tank vehicle adopted by the British Petroleum Co. Ltd. achieves 70 per cent payload with low centre of gravity and excellent roadworthiness. The vehicles are being built by Thompson Bros. (Bilston) Ltd., in conjunction with Leyland Motors Limited.

Irish Tourist Traffic Maintained.—Despite the disruption caused by the unofficial shipping strike, Irish tourist receipts this year are expected to be at least as high as in 1959—and possibly higher. The greater part of the increase in tourist receipts last year was derived from British visitors. The number of visitors from the U.K. rose from 694,000 to the record figure of 748,000, and the total value of receipts from cross Channel visitors rose from £16·5 million to £19·1 million. The number of visitors from Northern Ireland, other than day-trippers, declined for the fourth successive year, to less than half the figure for 1955.

New and Revised Standards for Pressure Vessels.—The British Standards Institution has published one new and two revised specifications for pressure vessels. Earlier editions of the two revised standards did not apply to air receivers for use on the railways, but this restriction has now been removed. Additionally, at the request of user bodies, the new standard (BS.3256) has been prepared specifically to deal with small air reservoirs for road and rail vehicles. One outcome of the extensive revision of BS.487 and 1099 is that thinner scantlings are now permitted for receivers constructed of material complying with BS.1633. A feature common to all the pressure vessels dealt with in these three publications is their classification according to the material and type of construction used and to whether they are heat-

treated after construction. Copies of these publications may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

Protest Against Train Delays.—Several hundred passengers sat on the railway tracks at Palestrina station, east of Rome, on September 6, in protest against persistent delays in the Cassino-Rome morning train service.

Best Kept Station Gardens Competition.—From the 177 Eastern Region stations which entered for the best kept gardens competition this year the following six stations were chosen for Special Class Awards: Great Eastern Line: Cantley, Elsenham, Histon, Stansted, Wolferton. Great Northern Line: Burgh-le-Marsh. In addition, 39 stations received First Class awards, and 24 gained Second Class awards.

English Electric Co., Ltd. Debenture Issue.—Lazard Bros. & Co. Ltd. announces that underwriting of an issue of £7,000,000 6 per cent debenture stock 1980–85 of the English Electric Co. Ltd. is in progress. This stock is being offered to the debenture, preference, and ordinary stockholders of the company at £96 10s. per cent. Applications should reach Lazard Bros. & Co. Ltd. not later than 3 p.m. on September 21.

Additional Service from Marylebone to North Bucks.—British Railways, Western Region, is to introduce a new evening train from Marylebone, to Beaconsfield, High Wycombe, and Princes Risborough from September 12. It will run each evening, except Saturdays, leaving Marylebone at 6.17 p.m. arriving at Beaconsfield at 6.51 p.m. High Wycombe at 7 p.m., and Princes Risborough at 7.17 p.m.

Railway Stock Market

A re-actionary trend developed in stock markets after their recent improvement, though there was little selling. Buyers became more cautious earlier this week, awaiting the latest trade figures for news whether the falling-off in export trade was continued last month. Another factor making for caution was the fear that Wall Street markets might decline in the next few months, partly because of the uncertainties of the Presidential election in the U.S.A.

Among foreign rails, Antofagasta ordinary stock was 12½ compared with 13 a week ago and the preference stock eased from 31 to 30½; the 4 per cent perpetual debentures were 45½.

Costa Rica ordinary stock has been maintained at 40, and Chilean Northern 5 per cent debentures at 55½. International of Central America common shares were $26 and the preferred $107.

Guayaquil & Quito assented bonds were quoted at 69½, Brazil Railway bonds at 5¾, and Paraguay Central Railway prior debentures at 16½.

United of Havana second income stock was 6, and the consolidated stock again quoted at 1. Sao Paulo Railway 3s. units kept at 1s. 1½d. Mexican Central "A" bearer debentures strengthened to 57½.

Midi 4 per cent sterling bonds were again quoted at 86 at which there is a yield of over 5⅛ per cent.

Canadian Pacifics, reflecting Wall Street, went back from $42½ to $41⅛, their lowest for the year, and now yield 6⅞ per cent. The 4 per cent preference stock rallied from 60½ a week ago to 61¾, and the 4 per cent debentures moved up from 63¾ to 64¾. White Pass shares were steady at $11½xd.

Among shares of locomotive builders and engineers, the best feature was an advance to 18s. 3d. from 16s. 6d. a week ago, in Wagon Repairs 5s. shares on attention drawn to the group's strong financial position. Gloucester Wagon 10s. shares at 13s. 6d. were 9d. higher on balance, but elsewhere, Charles Roberts 5s. shares eased on balance from 11s. 9d. to 10s. 9d. Beyer Peacock 5s. shares, however, have risen further from 7s. 6d. to 8s. 4½d., the 7 per cent yield attracting some attention. Westinghouse were a good feature, having risen further from 48s. 3d. a week ago to 50s. 6d. Birmingham Wagon gained 1s. at 34s. 10½d. North British Locomotive eased from 9s. 9d. to 9s. 6d. G. D. Peters were quoted at 16s. 3d.

Before news of the interim dividend, Vickers strengthened from 33s. 10½d. to 34s. 4½d. Dowty Group 10s. shares were slightly higher at 39s. 9d. and Pressed Steel 5s. shares kept at 30s. 3d. Mather & Platt improved to 49s. 9d., but elsewhere, Pollard Bearing 4s. shares lost a few pence at 45s. 9d. and Ransome & Marles 5s. shares eased to 27s. Profit-taking put Ruston & Hornsby back from 30s. 3d. to 28s. 6d. and T. W. Ward to 83s. while British Oxygen were 31s. 9d. compared with 33s. a week ago.

Associated Electrical eased to 49s. 4½d. and General Electric were 38s. 4½d. English Electric eased to 37s. following news of the £7,000,000 debenture issue, though the additional finance is required because of continued expansion in business, and prospects of the 10 per cent dividend being maintained are regarded in the City as good. On this basis English Electric shares give an attractive yield of over 5¼ per cent. In other directions, Broom & Wade 5s. shares firmed up from 22s. 9d. to 23s. Holman Bros. 10s. shares were 18s. 9d. and Edwards High Vacuum 4s. shares moved up 21s. 10½d.

Steels lost part of earlier gains; there has been talk that the Richard Thomas share offer may be made before long, which if correct, would monopolise attention in this section of markets. Metal Industries shares were, under the influence of the statements at the annual meeting, firm at 68s. 6d.

Forthcoming Meetings

September 19 (*Mon.*).—The Historical Model Railway Society, at Keen House, Calshot Street, N.1, at 7 p.m. Paper on "Welsh railways records," by Mr. T. L. Jones.

September 19 (*Mon.*).—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. Paper on "Mainline diesel locomotives," by Mr. G. O. B. Clark.

September 20 (*Tue.*).—Institution of Locomotive Engineers at Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1, at 5.30 p.m. Presidential Address of Mr. D. C. Brown.

September 22 (*Thu.*).—Railway Correspondence & Travel Society, West Riding Branch, at the Railway Institute, York, at 7.15 p.m. Paper on "Railway heraldry," by Mr. George Dow.

September 23 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, 163, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "L.B.S.C.R. suburban services," by Mr. O. J. Morris.

September 24 (*Sat.*)—The Permanent Way Institution. East Anglia Section. Visit to Brook Marine Limited, Lowestoft.

September 24 (*Sat.*) to September 25 (*Sun.*).—British Railways, Southern Region, Lecture & Debating Society. Tour of installations in South Wales.

September 26 (*Mon.*).—Institution of Railway Signal Engineers, Bristol Section, at Temple Meads Station, Bristol, at 6 p.m. Paper on "Signalling from the driver's point of view," by Mr. O. S. Nock.

September 26 (*Mon.*) to October 1 (*Sat.*).—Railway Students' Association Annual Summer Convention in Germany. Applications may be made to committee representatives.

September 29 (*Thur.*).—The Permanent Way Institution, Nottingham & Derby Branch, at the Midland Hotel, Derby, at 7.0 p.m. Exhibition of rail fastenings, followed by discussion.

September 29 (*Thur.*).—The Railway Club, at 6.45 p.m. Visit to the archives of the British Transport Commission.

October 1 (*Sat.*).—Railway & Canal Historical Society, at the eastern section of Booking Hall, Victoria Station, London, at 2.15 p.m. Centenary of the opening of Victoria Station, conducted tour.

October 1 (*Sat.*).—Railway Correspondence & Travel Society. "Northern Heights" tour. Departure from Fenchurch Street, Station at 1.55 p.m.

October 3 (*Mon.*).—The Society of Engineers, at Burlington House (entrance at east end), London, W., at 5.0 p.m. Paper by Mr. W. A. Crago on "Some notes on Hovercraft," illustrated by a film.

October 4 (*Tues.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society (Cardiff), at the Angel Hotel, Cardiff, at 6.30 p.m. Address entitled "Hong Kong," illustrated with coloured slides.

October 5 (*Wed.*).—British Railways (Southern Region) Lecture & Debating Society, at the Chapter House, St. Thomas' Street, London, S.E.1. Address by Brigadier Langley on "The history & work of the railway inspectorate, Ministry of Transport."

October 6 (*Thurs.*).—British Railways (Western Region) London Lecture & Debating Society, Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, at 5.45 p.m. Paper on "A day in parliament" by Mr. P. Morris.

October 8 (*Sat.*).—Permanent Way Institution, London Section. Visit to Jodrell Bank Radio Telescope, and Electrification Works between Crewe and Manchester Oxford Road.

October 8 (*Sat.*).—Railway & Canal Historical Society, North Western Section, at The Oddfellows Institute, Chestergate, Stockport, at 6.30 p.m. Open meeting; address by the President, Mr. C. R. Clinker.

OFFICIAL NOTICES

NEW ZEALAND RAILWAYS

VARIOUS D.C. Neutral Plug-in Relays and Mounting Bases for Railway Signalling required for New Zealand Railways. Specification No. E.698. Tenders closing Wellington, November 16. Specifications are obtainable from the New Zealand Government representatives in Washington, Tokyo and Sydney. Copy may be seen at the New Zealand Government Purchasing Branch, Adelphi Building, John Adam Street, London, W.C.2.

REQUIRED FOR THE CENTRAL RAILWAY OF PERU.—Assistant Engineer (Civil). Capable of designing steel bridge work, simple reinforced concrete structures and alterations to existing steel structures, of field work in connection with new projects and supervision of construction. Must be Chartered Civil or Structural Engineer with at least 5 years' experience in position of responsibility covering both design office and field work. Railway experience and knowledge of Spanish advantageous but not essential. Age 30-40 preferable single. Salary offered £1,550/£1,650 according to experience. Apply in writing to: Peruvian Transport Purchasing Company Limited, Suffolk House, 5 Laurence Pountney Hill, Cannon Street, London, E.C.4.